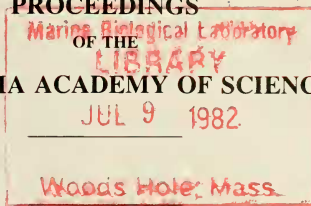


PROCEEDINGS
OF THE
CALIFORNIA ACADEMY OF SCIENCES



Vol. 43, No. 3, pp. 27-42

June 15, 1982

NEW SPECIES OF NORTH AMERICAN *TACHYSPHEX* WASPS
(HYMENOPTERA, SPHECIDAE)

By

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ABSTRACT: The following new North American species of *Tachysphex* are described (type-localities are given in parentheses): *acanthophorus* (Arizona: Willcox), *apricus* (California: Borrego Valley), *arizonae* (Arizona: 2 mi. NE Portal), *armatus* (Nevada: Sandy), *bohartorum* (California: Boca), *idiotrichus* (Arizona: 5 mi. W Portal), *irregularis* (California: Hallelujah Junction), *krombeiniellus* (Florida: Levy County), *lamellatus* (Mexico: Sonora: Alamos), *menkei* (California: Borrego Valley), *mirandus* (California: Palm Springs), *musciventris* (California: Borrego), *occidentalis* (California: 12 mi. E Lone Pine), *papago* (Arizona: Nogales), *solaris* (California: Borrego Valley), *spatulifer* (California: Arroyo Seco Camp), *verticalis* (California: 9 mi. W Beaumont), *yuma* (Mexico: Baja California: La Paz), and *yolo* (California: Davis).

INTRODUCTION

For several years, I have been working on a monographic revision of North American *Tachysphex*. Because of the size of this undertaking, it will be some time before it is finished. Therefore, I am describing some of the new species now so their names will be available to those persons working on *Tachysphex* behavior. Furthermore, many hundreds of paratypes have been deposited in 34 collections in the USA and abroad, and it is desirable to validate these manuscript names now to avoid their possible use as nomina nuda in the works of others. The descriptions given below are restricted to those features which enable unambiguous recognition of each species. More complete characterizations will be given when my revision is published.

The terminology used below is based mainly on Bohart and Menke (1976). A few terms which need clarifications are the following:

clypeus: the clypeus has a midsection and two lateral sections; the midsection usually has a densely punctate, setose basomedian area, a sparsely punctate shiny bevel, and a marginal lip.

scutum: this term is used here for brevity's sake instead of mesoscutum.

tergum, sternum: short terms for gastral tergum, gastral sternum.

Many collectors are cited numerous times in the lists of material examined. Their names have been abbreviated to initials, as follows: ASM, A. S. Menke; BV, B. Villegas; DRM, D. R. Miller; EEG, E. E. Grissell; EIS, E. I. Schlinger; GEB, G. E. Bohart; GDB, G. D. Butler; FDP, F. D. Parker; FGW, F. G. Werner; FXW, F. X. Williams; HKC, H. K. Court; JCH, J. C. Hall; JAP, J. A. Powell; JMD, J. M. Davidson; JWMS, J. W. MacSwain; LAS, L. A. Stange; MAC, M. A. Cazier; MEI, M. E. Irwin; MSW,

M. S. Wasbauer; PDH, P. D. Hurd; PMM, P. M. Marsh; PFT, P. F. Torchio; RCB, R. C. Bechtel; RMB, R. M. Bohart; ROS, R. O. Schuster; RRD, R. R. Dreisbach; TG, Terry Griswold; WJP, W. J. Pulawski.

In the geographic names below, the following words have been abbreviated: County, Co.; Creek, Cr.; Highway, Hwy.; Island, I.; miles, mi.; Mountain(s), Mt(s); River, R.; Station, Sta. The name Lower California has been used for the peninsula rather than Baja California, because the latter may refer either to the peninsula or to a state in Mexico. Altitudes and distances are given as they appear on the original labels—in feet and miles. Multiplying the distances in miles by 1.609 and the elevations in feet by 0.3048 will convert them into kilometers and meters, respectively.

SOURCES OF MATERIAL AND ACKNOWLEDGMENTS

The specimens described in this paper came from institutional and private collections listed below. The initials preceding the names are the abbreviations by which institutions or private collections are referred to in the text.

AMNH: American Museum of Natural History, New York, New York (M. Favreau)
 ANSP: Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania (D. C. Rentz)
 ASU: Arizona State University, Department of Zoology, Tempe, Arizona (F. F. Hasbrouck)
 BMNH: British Museum (Natural History), London, England (C. R. Vardy)
 CAS: California Academy of Sciences, San Francisco, California (P. H. Arnaud, Jr., T. J. Zavortink, W. J. Pulawski)
 CIS: California Insect Survey, Division of Entomology, University of California, Berkeley, California (H. Daly)
 CNC: Canadian National Collections of Insects, Arachnids and Nematodes, Biosystematics Research Institute, Ottawa, Ontario (J. R. Barron)
 CSDA: California Department of Food and Agriculture, Sacramento, California (M. S. Wasbauer)
 CSU: Colorado State University, Department of Zoology and Entomology, Fort Collins, Colorado (H. E. Evans)
 CU: Cornell University, Department of Entomology and Limnology, Ithaca, New York (L. L. Pechuman)
 FSCA: Florida State Collections of Arthropods, Gainesville, Florida (E. E. Grissell)
 HKT: H. K. Townes, American Entomological Institute, Ann Arbor, Michigan
 INHS: Illinois State Natural History Survey, Urbana, Illinois (W. E. LaBerge)
 KU: University of Kansas, Snow Entomological Museum, Lawrence, Kansas (G. W. Byers)
 KVK: K. V. Krombein, Arlington, Virginia (private collection), now in USNM
 LACM: Natural History Museum of Los Angeles County, Los Angeles, California (R. R. Snelling)

MCZ: Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts (J. Lawrence, J. C. Scott, M. K. Thayer)
 MPM: Milwaukee Public Museum, Milwaukee, Wisconsin (J. K. Lawton)
 NYSU: New York State University, College of Environmental Sciences and Forestry, Department of Environmental and Forest Biology, Syracuse, New York (F. E. Kurczewski)
 OSDA: State of Oregon Department of Agriculture, Salem, Oregon (R. L. Westcott)
 OSU: Oregon State University, Department of Entomology, Corvallis, Oregon (P. Oman, G. R. Ferguson)
 TG: Terry Griswold, % Bee Biology & Systematics Laboratory, Utah State University, Logan, Utah (private collection)
 UAE: University of Alberta, Department of Zoology, Edmonton, Alberta (A. L. Steiner)
 UAT: University of Arizona, Department of Entomology, Tucson, Arizona (F. G. Werner)
 UCD: University of California, Davis, Department of Entomology, Davis, California (R. M. Bohart, R. O. Schuster)
 UCR: University of California, Riverside, Department of Biological Control, Riverside, California (S. Frommer)
 UFG: University of Florida, Department of Entomology and Nematology, Gainesville, Florida (B. Saffer)
 UGA: University of Georgia, Department of Entomology, Athens, Georgia (R. W. Matthews, C. L. Smith)
 UIM: University of Idaho, Department of Entomology, Moscow, Idaho (W. F. Barr)
 UMSP: University of Minnesota, Department of Entomology and Zoology, St. Paul, Minnesota (P. J. Clausen)
 USNM: United States National Museum of Natural History (Smithsonian Institution), Washington, D.C. (A. S. Menke, K. V. Krombein)
 USU: Utah State University, Department of Zoology, Logan, Utah (G. E. Bohart, F. D. Parker, Terry Griswold)
 WJP: Wojciech J. Pulawski, % California Academy of Sciences, San Francisco, California (private collection)
 WSU: Washington State University, Department of Entomology, Pullman, Washington (M. T. James, R. Zack)

I express my sincere thanks to the curators and other persons who kindly submitted specimens for study. I feel especially indebted to R. M. Bohart, A. S. Menke, K. V. Krombein, and F. F. Kurczewski who helped me in many ways.

SPECIES GROUPS

Sixteen species groups are recognized in *Tachysphex* (see Pulawski 1971, 1974, 1977), but only four of them are represented in North America. They are: the *pompiliformis*, *terminatus*, *brullii*, and *julliani* groups. The species described in this paper belong to the *pompiliformis* and *brullii* groups which are defined as follows:

The *pompiliformis* group lacks peculiarities which characterize other groups and thus possibly is a heterogeneous assemblage of convenience. The propodeal hindface in this group is inclined, the female pygidial plate is not broad-

ened and without peculiar microsculpture, the preapical bristles on the female gastral segments are not thickened, and the male sterna are pruinose (except in *mirandus*). By comparison, in the *julliani* group the propodeal hindface is vertical or nearly so, male sterna are glabrous or sparsely pruinose, and in the females of most species the preapical bristles of gastral segments IV and V are thickened, and the pygidial plate is broadened or has a peculiar microsculpture. The vertex is simple in the *pompiliformis* group, while in the *terminatus* group a swelling is present behind each hindocellus. Unlike the *brullii* group, the apical female tarsomeres are simple (see that group for details). The *pompiliformis* group is cosmopolitan. Its species prey upon acridid nymphs, but the Palearctic species *fulvitaris* collects tettigoniids. The following new species are members of the *pompiliformis* group: *apricus*, *arizonac*, *bohartorum*, *idiotrichus*, *irregularis*, *lamellatus*, *mirandus*, *musci-ventris*, *occidentalis*, *papago*, *solaris*, *spatulifer*, *verticalis*, *yolo*, and *yuma*.

The *brullii* group is characterized by the peculiar apical female tarsomeres: dorsum convex, apicoventral margin produced into a lobe or at least convex, and vertex variously modified (covered with erect setae except glabrous basally, or angulate basally in lateral view, or densely spinose). In other groups the dorsum is scarcely convex, the apicoventral margin is straight or nearly so, and the venter is evenly covered with setae which are usually inclined (but erect in *verticalis*), and it may have a few spines in some species. Furthermore, the propodeal dorsum setae are erect or inclined backwards in most species of the *brullii* group, but only laterally so in *acanthophorus*, *alayoi*, *armatus*, many individuals of *mundus*, and some Australian species. Setae are inclined obliquely cephalad in the Australian species *brevicornis* and in most species of other groups. The *brullii* group is widespread throughout all zoogeographic regions. Some species prey upon tettigoniids, while others are blattid collectors. The following new species are members of this group: *acanthophorus*, *armatus*, *krombeinilius*, and *menkei*.

SPECIES OF THE POMPILIFORMIS GROUP

Tachysphex apricus sp.n.

ETYMOLOGY.—The specific name *apricus* is a Latin word meaning exposed to the sun.

DIAGNOSIS.—*Tachysphex apricus* differs from

other species of the *pompiliformis* group by the setal pattern of its propodeal dorsum: median setae are inclined cephalad, but the lateral setae are directed obliquely backwards and join apicoventrally. Some species of the *brullii* group (e.g., *acanthophorus*) have an identical pattern, but the unspecialized apical female tarsomere of *apricus* is distinctive. The male of *apricus* can be distinguished by the compressed femoral notch whose glabrous bottom forms an obtuse, longitudinal crest. *T. idiotrichus* has a similar crest, but unlike that species the body vestiture is short in *apricus*. Unlike most species of the *pompiliformis* group, the propodeal side of *apricus* is alutaceous, shiny, impunctate or minutely punctate.

GEOGRAPHIC DISTRIBUTION.—Xeric areas between southern Texas, southern Nevada, and southern California, and also Lower California.

MATERIAL EXAMINED.—HOLOTYPE: ♂, California, San Diego Co., Borrego Valley, 3 May 1956, P. D. Hurd (UCD).

PARATYPES: 38 ♀, 60 ♂, 31 Mar. to 3 July, 10 and 31 Aug., 9 Sep. Specimens for which institution is not indicated below are all in UCD.

UNITED STATES OF AMERICA

Arizona. **Cochise:** 6 mi. N Apache, collector unknown (1 ♀, NYSU). **Coconino:** 4.5 mi. E Moenkopi, JMD & MAC (1 ♀, ASU). **Maricopa:** 10 mi. E Gila Bend, GDB (2 ♂); 3 mi. sw Wickenburg, PFT & GEB (1 ♂, USU). **Mohave:** 4 mi. w Chloride, PFT, GEB, FDP (1 ♂, USU); 8 mi. E Mesquite (Nevada), FDP & PFT (1 ♀, USU). **Pima:** Organ Pipe Cactus National Monument, J. L. Sperry (1 ♀, 1 ♂); Tucson, W. Benedict (1 ♀, NYSU), Bryant (1 ♀, 1 ♂, CAS), FDP, LAS (1 ♀, 2 ♂; 1 ♀, WJP). **Pinal:** w Stanfield, GDB & FGW (1 ♀). **Yavapai:** Bloody Basin, collector unknown (1 ♀); 10 mi. NW Congress, FDP & LAS (1 ♀).

California. **Imperial:** Glamis, RMB (1 ♀), FDP (1 ♂); Palo Verde, ROS (1 ♀); Pinto Flat, FXW (1 ♂, CAS). **Inyo:** Antelope Springs, HKC (1 ♀, 5 ♂); Big Pine Cr., RMB (1 ♀), FDP (1 ♂); 2 and 5 mi. E Big Pine, EEG (1 ♀, 1 ♂); Little Lake, BV (1 ♀); 3 mi. w Lone Pine, RMB (2 ♂); Tuttle Cr. (2 mi. sw Lone Pine), JAP (1 ♀, CIS). **Kern:** Kernville, T. R. Haig (1 ♂). **Riverside:** 18 mi. w Blythe, RMB (1 ♂); 3.5 and 4 mi. s Palm Desert, MEI, S. Frommer & R. M. Worley (2 ♀, UCR); San Andreas Canyon, RMB (1 ♂); Shavers Summit, MSW (1 ♀, UCD); San Timoteo Canyon, MSW, R. McMaster (1 ♀, CSDA). **San Bernardino:** 1 mi. s Adelanto, MEI (1 ♂); Colton Hills, TG (2 ♀, TG), Kramer, MSW (2 ♀, 3 ♂, CSDA); 3 mi. s Kramer Junction, MEI (1 ♀); sand dunes 7 mi. sw Kelso, MSW & J. S. Washbauer (1 ♀, CSDA), Mitchells Caverns, TG (1 ♀, TG), 36 road mi. E Twenty-nine Palms, TG (1 ♂, TG). **San Diego:** Borrego Valley, RMB (4 ♂; 1 ♀, 2 ♂, USNM), JCH (1 ♂), PDH (4 ♂), G. A. Marsh (1 ♀), EIS (2 ♂; 2 ♂, WJP), MSW (1 ♂, CIS), MSW, J. Slansky (1 ♀, 1 ♂, CSDA), FXW (9 ♂, CAS); Scissors Crossing, J. C. Downey (1 ♀), H. & M. Townes (1 ♂, HKT). **Ventura:** Sespe Canyon, R. W. Sporne (1 ♀).

Nevada. **Clark:** Jean, GEB (3 ♂); 30 mi. s Searchlight, PFT, R. Rust, Youssef (1 ♂, USU).

New Mexico. **Dona Ana:** Las Cruces, RMB (1 ♀, UCD).
Otero: Alamogordo, collector unknown (1 ♀); Alamo Canyon near Alamogordo, MEI (1 ♂, UCR).

Texas. **Brewster:** Big Bend National Park (Nine Point Draw), W. R. M. Mason (1 ♀, CNC).

MEXICO

Lower California. San Ángel, N. Leppla, JMD, J. Bigelow, M. Bentzien, W. Fox, S. William, MAC (1 ♀, ASU); 16 mi. N Puertocitos, MEI (1 ♀, UCR).

Tachysphex arizonac sp. n.

ETYMOLOGY.—The specific name *arizonac* is an Indian word meaning little spring.

DIAGNOSIS.—*Tachysphex arizonac* is characterized by the well-defined mesopleural punctures, median scutal setae transversely oriented, and sternum I with a horizontal depression apically. The females of *arizonac* and *lamellatus* have a peculiar clypeus whose free margin is undulate; they can scarcely be distinguished from each other. A useful character is the hypostomal carina which is low in *arizonac*, but high in many *lamellatus*. Furthermore, in some *arizonac* the middle projection of the clypeal lip is markedly larger than the sublateral one (projections about equal in *lamellatus*). The male of *arizonac* has a peculiar clypeus: bevel semilunate, lobe forecorner prominent (acutely in some specimens), lip usually with obtuse projection mesally. The clypeus is somewhat similar in *texanus*, but in that species setae are appressed or nearly so beneath the mesopleural scrobe (setae suberect in *arizonac*).

GEOGRAPHIC DISTRIBUTION.—Southern Utah, Arizona, and adjacent areas of California; Sonora State in Mexico.

MATERIAL EXAMINED.—HOLOTYPE: ♂, Arizona, Cochise Co., 2 mi. NE Portal, 26 June 1964, J. M. Puckle, M. A. Mortenson, M. A. Cazier (UCD).

PARATYPES: 13 ♀, 17 ♂, 5 May to 17 July.

UNITED STATES OF AMERICA

Arizona. **Cochise:** Huachuca Mts., FXW (1 ♀, CAS; 1 ♀, 3 ♂, UCD). **Maricopa:** 3 mi. sw Wickenburg, PFT & GEB (1 ♀, UCD). **Pima:** Brown Canyon, Baboquivari Mts., K. W. Radford & W. Patterson (1 ♀, 2 ♂, UAT); Sabino Canyon, Santa Catalina Mts., RMB (1 ♂, UCD), collector unknown (1 ♀, WJP).

California. **Imperial:** Experimental Farm and no specific locality, J. C. Bridwell (3 ♀, 1 ♂, USNM; 2 ♀, 1 ♂, WJP). **Inyo:** Big Pine, N. J. Smith (1 ♂, UCD); Deep Springs, H. Nakakihara (1 ♂, UCR). **Riverside:** Upper Deep Canyon at Horsethief Cr., MEI (1 ♂, UCR).

Utah. **Washington:** Leeds Canyon, G. F. Knowlton, W. J. Hanson, T. H. Hsiao (2 ♀, 2 ♂, USU; 1 ♀, WJP); Santa

Clara, FDP & PFT (1 ♂, USU); Toquerville, G. F. Knowlton, W. J. Hanson (1 ♂, USU).

MEXICO

Sonora. **Cocorit,** FDP & LAS (1 ♂, UCD); **La Aduana,** FDP & LAS (1 ♂, UCD).

Tachysphex bohartorum sp. n.

ETYMOLOGY.—This species is dedicated to Dr. G. E. Bohart (Logan, Utah) and Dr. R. M. Bohart (Davis, California) who have made extensive contributions to our knowledge of North American *Tachysphex*, and who have also helped me in my studies.

DIAGNOSIS.—Like *pechumani*, the female of *bohartorum* has brassy golden frontal vestiture. The frontal vestiture is also golden in *psilocerus* which has a peculiar upper metapleuron. Unlike *pechumani*, the gaster of female *bohartorum* is all red, the flagellum is all black, the clypeal lip is deeply indented laterally (shallowly in *pechumani*), and the mesothoracic venter is peculiar (the posterior, horizontal part is shorter than the anterior, oblique part); the densely punctate-throughout tergum V is a subsidiary recognition feature. *T. bohartorum* is known from California, Oregon, and Nevada, while *pechumani* occurs in New Jersey and Michigan.

The male of *bohartorum* can be recognized by the closely punctate terga (punctures mainly subcontiguous) combined with the apicomesally impunctate and glabrous sterna II–IV.

Supplementary diagnostic characters of both sexes are: propodeum not ridged (at most the hindface has a few, inconspicuous ridges below); propodeal dorsum with setae appressed mesally, oriented obliquely anterad.

GEOGRAPHIC DISTRIBUTION.—Montane areas of southern Oregon and northern California, also Sierra Nevada.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, Nevada Co., Boca, 11 July 1961, R. M. Bohart (UCD).

PARATYPES: 90 ♀, 231 ♂, 24 Apr., 8 June to 14 Aug., mainly UCD, also BMNH, CAS, CIS, CNC, CSDA, LACM, MCZ, OSU, TG, UCR, USNM, WJP.

California. **Alpine:** Carson Pass, RMB (1 ♂); Hope Valley, PDH (1 ♂), P. C. Hutchinson (1 ♀); 15 mi. NE Red Lake, EIS (2 ♂); Winnemucca Lake, RMB (1 ♀, 2 ♂), N. J. Smith (2 ♀, 1 ♂); Woodfords, W. W. Middlekauf (3 ♂). **Del Norte:** Little Grayback (NE part of county), JAP (4 ♀, 4 ♂, CIS). **Eldorado:** Meyers, RMB (1 ♂); Tahoe, FXW (3 ♀, 3 ♂); Strawberry Valley, E. C. VanDyke (1 ♀); Echo Lake, W. W. Middlekauf (1 ♀, 1 ♂); Echo Portal, P. H. Arnaud (1 ♀); Echo Pass, C. A. Downing (1 ♀). **Humboldt:** Red Cape Lake, TG

(1 ♀, 1 ♂, TG). **Inyo:** Big Pine Cr., 7500 ft, RMB (1 ♀, 1 ♂); near Mono Pass, 12,000 ft, C. D. MacNeill (1 ♀, CIS). **Lassen:** Bridge Cr. Camp, RCB, RMB, G. Schaefers (6 ♀, 1 ♂); Summit Camp, JWMS (1 ♀). **Mariposa:** Sentinel Dome Cutoff (Yosemite National Park), T. N. Seeno (1 ♀). **Modoc:** Cedar Pass in Warner Mts., JWMS (1 ♀, 2 ♂, CIS), 6000 ft, collector unknown (1 ♀); Warner Mts, 2 mi. NNW Fort Bidwell, D. C. Rentz & C. D. MacNeill (1 ♂, CAS). **Mono:** 11 mi. N Bridgeport, RMB, PMM (3 ♂); East Walker R., 13 mi. NE Bridgeport, MSW & J. S. Washbauer (2 ♂); Leavitt Meadow, R. L. Usinger (1 ♂, CIS). **Nevada:** Boca, RMB, MEI, PMM, WJP (8 ♀, 11 ♂); Sagehen Cr. near Hobart Mills, RMB, R. C. Blaylock, R. L. Brumley, M. A. Chambers, R. H. Goodwin, EEG, D. S. Horning, PDH, MEI, JAP, WJP, G. Schaefers, R. L. Westcott (15 ♀, 98 ♂). **Placer:** Carnelian Bay (Lake Tahoe), RMB, FDP, WJP, BV (3 ♀, 21 ♂); Tahoe, FXW (1 ♂). **Plumas:** Bucks Lake, EIS (1 ♂); Burks, FXW (1 ♀); Lake Almanor, E. G. Linsley (1 ♂); Meadow Valley, W. H. Nelson (1 ♀); 14 mi. W Quincy, W. Turner (1 ♀, 2 ♂, WSU). **Shasta:** Lake Eiler, C. H. Spitzer (1 ♀); Lassen Peak, 7500 ft, JWMS (1 ♀). **Sierra:** Independence Lake, RMB, R. D. Moon (16 ♀, 51 ♂), BV (1 ♀); Kyburz Flat, RMB (1 ♂); Sierra Buttes, F. J. Montgomery (1 ♀); Sierra Valley, RMB (1 ♂); Sierra-ville, RMB (1 ♂); Yuba Pass, MEI (1 ♂, UCR). **Siskiyou:** McBride Springs (3 mi. NNE Mt. Shasta City), C. D. MacNeill (3 ♂); Mount Shasta, JAP (2 ♀), 1 mi. SE Salmon Mt., TG (2 ♂, TG). **Trinity:** Coffee Cr. Ranger Sta., A. J. Mueller (1 ♀), JWMS (1 ♀, CIS). **Tuolumne:** Chipmunk Flat, ASM (1 ♀), JWMS (1 ♀, CIS); Dardanelle, EIS (1 ♀); Sonora Pass, 9–10,000 ft, S. M. Kappos, JWMS (1 ♀, 2 ♂).

Nevada. **Douglas:** Spooners Lake N junction Hwy. 28, P. Adams (2 ♂). **Washoe:** Mount Rose, 6500 ft, RMB (1 ♂).

Oregon. **Jackson:** 8 mi. SE Butte Falls, R. L. Westcott (1 ♀, OSDA). **Klamath:** 15 mi. NE Bly, Schuh & Denning (1 ♀, OSU); Eagle Ridge near Klamath Lake, C. L. Fox (1 ♀); Lake of the Woods, H. A. Scullen (2 ♀). **Lake:** Warner Pass, DRM (1 ♂).

Tachysphex idiotrichus sp.n.

ETYMOLOGY.—The specific name *idiotrichus* is derived from the Greek words *idios*, own, peculiar, and *trix* (tricho-), hair; with reference to the peculiar vestiture.

DIAGNOSIS.—*Tachysphex idiotrichus* differs from other North American species of the *pompiliformis* group by the unusually long setae on the head, thorax, and femora (the vertex setae, for example, equal 2.2–3.0 midocellar diameters); the large punctures on the middle section of the female clypeus (also basally); the presence of graduli on sterna III–V of the female; and sparsely punctate (except apex) male tergum VII. Subsidiary diagnostic characters are: sparsely punctate vertex; and in the male: vertex width more than twice length (like *pechumani*); presence of graduli on sterna III–VI (like *ashmeadii*, *glabrior*, *irregularis*, and *verticalis*); and compressed forefemoral notch (as in *apricus*).

GEOGRAPHIC DISTRIBUTION.—Low mountains of southwestern Texas, New Mexico, southern Arizona, and southern California south to Jalisco State, Mexico.

MATERIAL EXAMINED.—**HOLOTYPE:** ♀, Arizona, Cochise Co., Southwest Research Sta., 5 mi. W Portal, 20 Oct. 1962, Vincent Roth (UCD).

PARATYPES: 25 ♀, 11 ♂; 19 Feb. to 30 Nov.

UNITED STATES OF AMERICA

Arizona. **Cochise:** 3 mi. E Apache, Rozen & Schrammel (1 ♀, UCD); 2 mi. W Chiricahua National Monument, A. L. Steiner (1 ♀, WJP); NW Portal, O. W. Richards (2 ♀, BMNH); 2 mi. SW Portal, A. L. Steiner (1 ♀, UAE); same data as holotype, except 1 ♀, 19 Feb. 1963 (3 ♀, UCD, USNM, WJP); same locality, MAC & Ordway (1 ♂ AMNH); Sulphur Springs Valley, G. Munson (1 ♀, UCD); 14 mi. W Tombstone, RMB (1 ♀, AMNH); 4 ♀, 2 ♂, UCD; 1 ♂, USNM; 1 ♂, WJP); same locality, FDP (1 ♀, 2 ♂, UCD); 1 mi. SE Willcox, G. I. Stage (1 ♀, CAS). **Pima:** Tucson, M. L. Noller (1 ♀, UAT). **Yavapai:** Cottonwood, R. C. Miller (2 ♀, 1 ♂, UCD); 7 mi. N Cottonwood, R. C. Miller (1 ♂, UCD).

California. **San Bernardino:** Mid Hills (9 mi. SSE Cima), 5400–5500 ft, TG (2 ♀, TG).

New Mexico. **Hidalgo:** Rodeo to Road Forks (1 ♀, UCD). **Otero:** Alamogordo, collector unknown (2 ♀, UCD). **Socorro:** 10 mi. W Socorro, U. N. Lanham (1 ♀, CSU).

Texas. **Pecos:** no specific locality, RMB (1 ♂, UCD).

MEXICO

Jalisco. Lagos de Moreno, R. C. Bechtel & EIS (1 ♂, UCD).

Tachysphex irregularis sp.n.

ETYMOLOGY.—The specific name *irregularis* is a Latin word for irregular, with reference to the mesopleural sculpture.

DIAGNOSIS.—*Tachysphex irregularis* differs from other members of the *pompiliformis* group in having a rugose or punctatorugose mesopleuron. The subsidiary recognition features are: the almost impunctate venter of the female trochanters, and in the male: presence of graduli on sterna III–VI, sternal punctures about as large as those on the mesothoracic venter.

GEOGRAPHIC DISTRIBUTION.—Western U.S., eastwards to Wyoming and New Mexico.

MATERIAL EXAMINED.—**HOLOTYPE:** ♀, California, Lassen Co., Hallelujah Junction, 12 July 1954, G. A. Schaefers (UCD).

PARATYPES: 41 ♀, 29 ♂; 16 Apr. to 11 Sep.

Arizona. **Cochise:** 8 mi. NE Apache, PDH, E. G. Linsley (1 ♀, 1 ♂, CIS); 14 mi. W Tombstone, FDP (1 ♂, UCD). **Pinal:** 8 mi. SE Olberg, M. A. Mortenson, JMD, MAC (1 ♀, UCD).

California. **Inyo:** Bishop, F. P. VanDuzee (2 ♀, UCD, WJP). **Lassen:** Hallelujah Junction, RMB, J. E. Gillaspay, C. J. Horning, G. A. Schaefers, F. Morishita, EIS, R. H. James,

R. L. Sisson (11 ♀, 10 ♂; AMNH, MCZ, UCD, USNM, WJP). **Modoc:** 5.5 mi. E Cedarville, V. L. Vesterby (1 ♂, UCD); Hot Cr., RMB & GEB (1 ♀, UCD). **Mono:** Benton Crossing, F. G. Andrews (2 ♀, UCD). **Nevada:** Boca, RMB (5 ♀, 1 ♂, UCD), MEI (1 ♂, UCD); Sagehen Cr., PDH (1 ♂, UCD). **Sierra:** Sattley, RMB (2 ♂, UCD). **Siskiyou:** Macdoel, J. Schuh (2 ♀, UCD), Hatfield, J. Schuh (1 ♂, UCD); Mt. Shasta City, JAP (1 ♀, UCD); Red Rock, J. Schuh (1 ♀, UCD). **Tuolumne:** Sonora Pass, R. W. Thorp (1 ♀, UCD).

Colorado. **Jackson:** 10 mi. N junction of roads 14 & 40, R. & K. Dreisbach (1 ♀, UCD). **Mineral:** South Clear Cr., TG (1 ♀, TG). **Routt:** 7 mi. E Hayden, J. S. Buckett (1 ♂, UCD).

Idaho. **Canyon:** Nampa, GEB (1 ♀, UCD). **Cassia:** 4 mi. SE Malta, R. L. Westcott (1 ♀, UIM); 5 mi. N Malta, R. A. Mackie (1 ♀, UIM). **Custer:** 2 mi. E Leslie, D. S. Horning (1 ♀, UCD). **Elmore:** 4 mi. E Orchard, A. J. Walz (1 ♂, UIM). **Owyhee:** Silver City, A. R. Gittins (1 ♀, UIM); 17 mi. W Silver City, A. R. Gittins (1 ♀, 1 ♂, UIM).

Nevada. **Elko:** Cobb Cr., 6 mi. SW Mountain City, P. H. Baldwin (1 ♀, UCD). **Humboldt:** Orovada, MEI (1 ♂, UCD), FDP (1 ♀, UCD); Paradise City, P. H. Baldwin (1 ♂, UCD); 15 mi. E Paradise City, collector unknown (1 ♂, WJP). **Washoe:** Reno Hot Springs, C. N. Slobodchikoff (1 ♀, CAS), Sky Ranch near Reno, EIS (1 ♂, UCD).

New Mexico. **Dona Ana:** Las Cruces, Arabella Sanchez (1 ♀, UCD). **Hidalgo:** Rodeo, PDH (1 ♂, UCD), H. V. Weems (1 ♂, FSCA).

Oregon. **Klamath:** Lower Klamath Lake, J. Schuh (1 ♀, UCD).

Wyoming. **Fremont:** Shoshoni, GEB & PFT (1 ♂, USU).

Tachysphex lamellatus sp.n.

ETYMOLOGY.—The specific name *lamellatus* is a Latin adjective derived from *lamella*, with reference to the unusually high hypostomal carina.

DIAGNOSIS.—*Tachysphex lamellatus* has a punctate mesopleuron, median scutal setae transversely oriented, and sternum I apically with a horizontal depression. Several other species share these features. Males of *lamellatus* and *sonorensis* have a triangular or subtriangular clypeal lip and a nondentate inner mandibular margin; unlike *sonorensis*, flagellomeres III and IV of *lamellatus* are about equal in length. Females of *lamellatus* and *arizonae* have a peculiar, undulate-free margin of the clypeal lip, but they cannot be distinguished with certainty from each other. The hypostomal carina is unusually high in some females and most males of *lamellatus*, and the gena adjacent to the hypostoma is ridged in most males. Both features are unique to *lamellatus*, and when present, distinguish the species from all other *Tachysphex*.

GEOGRAPHIC DISTRIBUTION.—New Mexico to southern California, north to southwestern Utah, and Mexico.

MATERIAL EXAMINED.—**HOLOTYPE:** ♂, Mexico, Sonora, Alamos, 25 Feb. 1963, P. H. Arnaud, Jr. (CAS Type No. 13465).

PARATYPES: 76 ♀, 45 ♂, 2 Jan., 25 Feb. to 15 May (Mexico), 10 Mar. to 25 Oct. (USA). Specimens for which institution is not indicated below are kept in UCD.

UNITED STATES OF AMERICA

Arizona. **Cochise:** Paradise, LAS (1 ♀); Portal, JMD (1 ♀); 5 mi. SW Portal, C. W. Sabrosky (1 ♀, USNM); same locality, M. Stathem (1 ♀); 5 mi. W Portal, V. Roth (1 ♂, NYSU); same locality, collector unknown (1 ♂, NYSU); Ramsey Canyon, Huachuca Mts., R. F. Sternitzky (3 ♂, CNC). **Gila:** Gila R. 3 mi. SW Christmas, FGW (1 ♂, UAT). **Pima:** Baboquivari Mts., Bryant (1 ♀, CAS), A. L. Melander (2 ♀, 1 ♂), K. W. Radford & W. Patterson (7 ♀, 2 ♂, UAT); Elkhorn Ranch, Baboquivari Mts., M. L. Noller, K. Roever (2 ♀, UAT); Madera Canyon, 4400 ft. Santa Rita Mts., HKC (1 ♀), ASM & WJP (1 ♀, WJP), FGW (3 ♀, 1 ♂, UAT); Madrona Ranger Sta., Rincon Mts., M. L. Noller, J. C. Bequaert, H. Elton (2 ♀, 1 ♂, UAT); Molino Camp, Santa Catalina Mts., R. S. Beal (1 ♂, CIS); Sabino Canyon, Santa Catalina Mts., RMB (1 ♀), R. H. & L. D. Beamer, W. LaBerge, C. Ljang (1 ♀, KU), A. D. Telford (1 ♀, 1 ♂); Santa Catalina Mts., FGW & GDB (1 ♀); Tucson, Bryant (1 ♀, CAS), FGW, Malaise trap (2 ♀, UAT); 5 mi. N Tucson, FGW & GDB (1 ♀). **Pinal:** Superior, Boyce Thompson Arboretum, FGW, J. Bequaert (1 ♂, UAT). **Santa Cruz:** Florida Canyon (Santa Rita Mts.), D. P. Levin (1 ♀, UIM); Madera Canyon (Santa Rita Mts.), D. P. Levin (1 ♂, UIM); Patagonia, FGW & GDB (1 ♀); Sycamore Canyon, Tumacacori Mts., A. & H. Dietrich (1 ♀, NYSU). **Yavapai:** Irving Power Sta., w Strawberry, O. Flint & ASM (1 ♂, USNM). Also Atascosa Mts. [a mistake for Atasco Mts.], R. H. Crandall (1 ♀, 1 ♂, USNM).

California. **Inyo:** Darwin Falls, JAP (1 ♂, CIS). **Orange:** Laguna Canyon, MEI (1 ♀, UCR). **San Bernardino:** Cajon Pass, J. E. Gillaspay (1 ♀); Mid Hills (9 mi. SSE Cima), TG (2 ♀, 2 ♂, TG).

New Mexico. **Catron:** Glenwood, RMB (1 ♀). **Luna:** 6 mi. NW Florida, J. S. Buckett, M. R. & R. C. Gardner (2 ♀).

Utah. **Washington:** Leeds Canyon, Malaise trap (2 ♀, 1 ♂, USU).

MEXICO

Chihuahua, 6 mi. S Encinillas, MEI (1 ♀, UCR).

Hidalgo, Jackala, L. D. Beamer (1 ♀, KU).

Puebla, 3 mi. NW Petalcingo, FDP (1 ♂).

Sinaloa, 9 mi. E Chupaderos, FDP, LAS (1 ♀, 2 ♂); 54 mi. S Culiacán, MEI (7 ♀, 2 ♂, UCR).

Sonora, Alamos, same data as holotype (9 ♀, 17 ♂; CAS, UCD, WJP); La Aduana, FDP, LAS (8 ♀, 1 ♂; 4 ♀, UCR), LAS (4 ♂).

Tres Marias Islands, Maria Magdalena I., H. H. Keifer (1 ♀, CAS).

Tachysphex mirandus sp.n.

ETYMOLOGY.—The specific name *mirandus* is a Latin word meaning wonderful, strange, singular.

DIAGNOSIS.—*Tachysphex mirandus* can be recognized by its peculiar sculpture. In both

sexes, the punctures are larger on the lateral clypeal section than on the adjacent frons, although the difference is slight in some specimens. The midfemur (also female forefemur) is alutaceous basoventrally, with only a few, sparse punctures. In the female, terga II-V are alutaceous, glabrous (except somewhat pubescent laterally). The male can also be recognized by the mesally nonpubescent, largely glossy and sparsely punctate sterna II-VI combined with the nondentate inner mandibular margin, triangular clypeal lip, and the nonangular clypeal free margin between the lip and the lateral section. Subsidiary recognition features of both sexes are: mesopleural setae suberect (almost as in *semirufus*); horizontal part of mesothoracic venter in most specimens glossy, sparsely punctate, contrasting with dull, strongly microsculptured mesopleuron.

GEOGRAPHIC DISTRIBUTION.—Xeric areas of Nevada, Arizona, southern California, and Lower California.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, San Bernardino Co., Palm Springs, 11 Feb. 1958, A. Melander (USNM).

PARATYPES: 17 ♀, 6 ♂, 20 Jan. to 14 Apr.

UNITED STATES OF AMERICA

Arizona. **Mohave:** 4 mi. s Hoover Dam, A. R. Gittins (1 ♂, UIM).

California. **Fresno:** Pinoche, 29 Mar. 1930, E. C. VanDyke (1 ♀, UCD). **Imperial:** 9 mi. w Coyote Wells, 26 Mar. 1961, PDH (1 ♂, CIS); Ocotillo, 22 Mar. 1966, PDH (2 ♀, 1 ♂, CIS); Yuha Desert, 15 Feb. 1948, C. D. MacNeill (1 ♀, CAS). **Kern:** 3 mi. nw Indian Wells, 12 Apr. 1954, J. M. Linsley (1 ♀, CIS); Short Canyon (7 mi. nw Inyokern), 15 Mar. 1955, PDH (1 ♂, CIS). **Los Angeles:** Little Rock, 28 Mar. 1971, RMB (1 ♀, UCD); 22 Mar. 1941, Don Wasem (1 ♀, UCD). **Riverside:** Whitewater, 14 Apr. 1958, H. R. Moffitt (1 ♀, UCD). **San Bernardino:** 5 mi. s Essex, 26 Mar. 1970, EEG & R. F. Denno (1 ♀, UCD); 14 mi. e Newberry, A. E. Michelbacher, 31 Mar. 1964 (1 ♀, CIS). **San Diego:** Borrego Valley, 2 & 11 Apr., RMB (2 ♀; UCD, WJP); Borrego Springs, 30 Mar. 1960, MSW (1 ♂, UCD). **San Luis Obispo:** Cuyama Valley, 30 mi. w Maricopa, 21 Mar. 1931, E. P. VanDuzee (1 ♀, UCD). **Tulare:** Kaweah Power House, 20 Jan. 1972, F. G. Andrews (1 ♀, CSDA).

Nevada. **Nye:** Mercury, N. T. S. [collector?], 24 Apr. 1961 (1 ♀, USNM); 28 Mar. 1962 (1 ♂, USNM).

MEXICO

Baja California Norte. **Diablo Canyon,** E face of Sierra San Pedro Martir, 6 Apr. 1973, J. Donohoe (1 ♀, CIS); Upper Cantillas Canyon (Sierra Juárez), 19 Mar. 1967, JAP (1 ♀, CIS).

Tachypex musciventris sp.n.

ETYMOLOGY.—The specific name *musciventris* is derived from the Latin words *muscus*, moss, and *venter*; with reference to the dense pubescence on the female mesothoracic venter and male sterna.

DIAGNOSIS.—The peculiar mesothoracic venter of the female of *musciventris* is unique among *Tachypex*: the mesothoracic venter is deeply sunken and densely pubescent along the midline on the posterior (horizontal) half. The mesally notched clypeal lip and the usually red hindleg are additional diagnostic characters.

The males of *musciventris* and an undescribed species have a triangular clypeal lip, ill-defined mesopleural punctures, and velvety pubescent sterna III-VI (integument all or largely concealed). Unlike the other species, the vertex width in *musciventris* is 1.6-2.0 times its length, the vestiture is appressed on the hypopimeral area, and sternum II is velvety pubescent.

GEOGRAPHIC DISTRIBUTION.—California to southwestern Texas, north to southwestern Utah, south to northwestern Mexico.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, San Diego Co., Borrego, 2 Apr. 1973, R. M. Bohart (UCD).

PARATYPES: 225 ♀, 216 ♂; 25 Mar. to 15 June, and 16-22 Nov.; mostly UCD, but also AMNH, BMNH, CAS, CIS, CNC, CSDA, OSU, TG, UCR, UIM, USNM, USU, WJP.

UNITED STATES OF AMERICA

Arizona. **Cochise:** Dragoon Mts., GDB & FGW (1 ♀). **Gila:** Globe, GEB (1 ♀). **Maricopa:** 8 mi. s Buckeye, MEI (3 ♂, UCR); Gila Bend, GDB & FGW (1 ♀); 18 mi. s Gila Bend, S. A. Gorodenski, JMD, MAC (1 ♀); 5 mi. n Mesa, A. R. Gittins (1 ♀, UIM). **Mohave:** 8 mi. e Mesquite, Nevada, FDP & PFT (3 ♀); 16 mi. n Wikieup, GDB & FGW (1 ♂). **Pinal:** w Stanfield, GDB & FGW (1 ♂). **Santa Cruz:** Tubac, PFT (1 ♂). **Yavapai:** 18 mi. n Aguila, FDP (1 ♀, USU). **Yuma:** Dateland, GDB & FGW (1 ♀); Ligurta, RMB (1 ♀); 15 mi. n Yuma, MEI, FDP (2 ♀); 22 mi. n Yuma, S. A. Gorodenski, JMD, MAC (1 ♀).

California. **Amador:** 5 mi. e Jackson, W. E. Simonds (1 ♂). **Fresno:** 10 mi. w Coalinga, RMB (1 ♂). **Imperial:** Chocolate Mts., Ogilby Road, 3 mi. s junction Hwy. 78, MSW (1 ♀, CSDA); Fish Cr. Mts., D. F. Hardwick (1 ♀); Glamis, RMB, PMM, FDP (4 ♀, 5 ♂); 3 mi. n Glamis, MJW (5 ♀); Palo Verde, MSW & J. S. Wasbauer, PDH (3 ♀); 3 mi. s Palo Verde, G. Tamaki (1 ♀, CIS); 8 mi. s Palo Verde, C. A. Toschi (1 ♂, CIS). **Inyo:** Wildrose Canyon, ASM (1 ♂). **Lake:** Lucerne, D. J. & J. N. Knull (1 ♀). **Kern:** 14 mi. n Blackwells Cor., C. D. MacNeill (2 ♂, CIS); Iron Canyon (El Paso Mts.), C. A. Toschi (1 ♀, CIS); 19 mi. w Shafter, RMB (1 ♀). **Lassen:** Bridge Cr. Camp, J. E. Gillaspay (1 ♂); Summit Camp, PDH, E. G. Linsley (4 ♂). **Los Angeles:** 2.5 mi. Pearblossom, R. W. Brooks (1 ♀); Little Rock, E. P. VanDuzee (1 ♀). **Modoc:**

Cedar Pass, D. L. Dahlsten (1 ♂). **Monterey:** Monterey, FDP (1 ♀). **Riverside:** Boyd Desert Research Center (4 mi. s Palm Desert), C. A. Toschi (2 ♀, CIS); 18 mi. w Blythe, RMB, D. S. Horning, MEI, FDP, ROS (1 ♀, 28 ♂); 10 mi. NW Cottonwood (Joshua Tree National Monument), PDH (1 ♀, CIS); Deep Canyon (3.5 mi. s Palm Desert), JCH (1 ♀, UCR), C. Wilkinson (1 ♀); 5 mi. s Hemet, RMB (1 ♂); Hwy. 74 × Strawberry Cr., EIS (1 ♀, CIS); Hopkins Well, PDH, E. G. Linsley, JAP (6 ♀, 11 ♂); Indio, J. Wilcox (1 ♀, OSU); Keen Camp in San Jacinto Mts., EIS (1 ♂); Millard Canyon, MEI (1 ♂); 7 mi. w North Palm Springs, TG (1 ♂, TG); Palm Canyon, EIS (1 ♂, UCR); Palm Springs, C. Dammers, 11 Nov. (4 ♀); Pinon Flat in San Jacinto Mts., E. S. Ross (1 ♀); Riverside, JCH (1 ♀, UCR), TG (1 ♂, TG); 4 mi. s Riverside, RCB, EIS (2 ♀, 3 ♂); Shavers Summit, MSW (2 ♀); Strawberry Canyon, W. A. Hunt (1 ♀, UCR); Thousand Palms, RMB, EEG, MEI, PMM, DRM, FDP, W. R. Richards (22 ♀, 51 ♂); 10 mi. E Whitewater RMB (1 ♀, 3 ♂). **San Bernardino:** 13 mi. E Amboy, E. G. Linsley, JWMS (13 ♀, 7 ♂); Baker, F. G. Andrews (1 ♀, UCR); 4 mi. s Baker, MSW & J. S. Wasbauer (1 ♀, 1 ♂); 3 mi. w Barstow, Brown & Lundgren (1 ♀, CAS); 2 mi. w Cajon Pass, EIS (1 ♂); Colton, E. P. VanDuzee (1 ♀); 5 mi. SE Hesperia, Rozen & Schrammel (2 ♀); sand dunes 7 mi. SE Kelso, MSW (1 ♂); Needles, JWMS (1 ♂); 2 mi. w Phelan, EIS (1 ♂); Red Mountain, D. F. Hardwick (1 ♀); Vidal Junction, PDH (1 ♀). **San Diego:** Alpine, FXW (1 ♂, CAS); Borrego, RMB, C. Goodpasture, EEG, PDH, H. L. McKenzie, A. L. Melander, FDP, R. Snelling, MSW (97 ♀, 56 ♂); Coyote Cr. (Borrego Valley), FDP (1 ♂); Coronado, F. E. Blaisdell (1 ♀); Scissors Crossing, R. R. Pinger (1 ♂). **San Luis Obispo:** 5 mi. w Nipomo, RMB, C. Goodpasture (5 ♂); 10 mi. w Simmler, PDH, R. W. Thorp, C. A. Toschi (4 ♀, 6 ♂, CIS). **Ventura:** Hungry Valley (5 mi. s Gorman), PDH, JAP (7 ♀, 7 ♂).

Nevada, Clark: 20 mi. w Glendale, FDP & PFT (4 ♀).

New Mexico. **Dona Ana:** 4 & 11 mi. N Las Cruces, ♀, W. Richards (2 ♀); Mesilla, GEB (1 ♂, UCD).

Texas. **Hudspeth:** Sierra Blanca, J. O. Martin (1 ♀).

Utah. **Washington:** Santa Clara, FDP & PFT (1 ♀, USU).

MEXICO

Lower California. 7 mi. s Guadalupe, MEI (1 ♂, UCR), San Quintin, FXW (1 ♀, CAS).

Sonora. 60 mi. E San Luis, G. R. Ballmer (1 ♀, UCR), 23 km SW Sonoita, B. & C. Durden (1 ♀, AMNH).

Tachysphex occidentalis sp.n.

ETYMOLOGY.—The specific name *occidentalis* is a Latin adjective meaning western; with reference to the geographic distribution of the species.

DIAGNOSIS.—Sternal punctures of male *occidentalis* are well defined, about as large as those of the mesothoracic venter (sometimes markedly larger). Sternal punctures are similar in some other species (e.g., *irregularis*, *tarsatus*), but the clypeal lobe of *occidentalis* is contrastingly rounded, nonangulate laterally, and the inner mandibular margin is nondentate (or at most with a rudimentary tooth). The usual presence

of a foretarsal rake is an additional recognition feature.

The female of *occidentalis* is less distinctive. It is primarily characterized by the combination of the impunctate mesopleuron, nonridged or only finely ridged propodeal side, the suberect setae on the hypoepipimeral area, and the evenly arcuate clypeal lip (neither emarginate mesally nor indented laterally). Females of several other species share these features: *apricus*, *idiotrichus*, some *krombeini*, *mirandus*, many *semirufus*. Most of them have various prominent diagnostic features which are absent in *occidentalis*. Furthermore, *occidentalis* and some undescribed species have the clypeal free margin less concave between the lobe and orbit than do the other species. Subsidiary recognition feature of female *occidentalis* is the red hindfemur (partly or all) and hindtibia.

GEOGRAPHIC DISTRIBUTION.—Xeric areas west of the Rocky Mountains, north to Oregon and Idaho, south to Arizona and Lower California.

MATERIAL EXAMINED.—**HOLOTYPE:** ♂, California, Inyo Co., 12 mi. E Lone Pine, 19 May 1970, R. M. Bohart (UCD). **PARATYPES:** 53 ♀, 96 ♂, 4 Apr. to 23 July, 3 Aug., 28 Sep. Specimens for which institution is not indicated below are all in UCD.

UNITED STATES OF AMERICA

Arizona. **Apache:** Lukachukai, L. Burroughs, J. Bigelow, MAC (1 ♀, ASU). **Cocino:** 4.5 mi. E Moenkopi, J. H. & J. M. Davidson, MAC (2 ♀, ASU). **Mohave:** 8 mi. NE Mesquite (in Nevada), FDP & PFT (1 ♀, USU). **Navajo:** Jadito Trade Post, same collectors (2 ♀, ASU).

California. **Fresno:** Jocolitos Canyon, RMB (1 ♂). **Inyo:** Antelope Springs, MEI (1 ♀, UCR), 15 mi. s Big Pine, EEG (1 ♂); Deep Springs, D. Giuliani, MSW & J. S. Wasbauer, MSW & J. Slansky (4 ♀, 13 ♂, CSDA: 1 ♂, WJP; same locality, RMB, BV (6 ♂); Lone Pine, N. W. Frazier (1 ♀); 3 mi. N Lone Pine, JAP (1 ♂, CIS); 7.3 mi. w Lone Pine, Ballmer & Bath (1 ♀); 12 mi. NE Lone Pine, RMB, EEG (1 ♀, 6 ♂). **Kern:** 14 mi. w Shafter, RMB (1 ♀). **Lassen:** Hallelujah Junction, MEI (2 ♂, UCR). **Los Angeles:** 1 mi. w Little Rock, E. G. & J. W. McSwain (1 ♂). **Mono:** Chalfant, BV (1 ♂); 7 mi. SW Lee Vining, A. D. Telford (1 ♀). **Monterey:** Arroyo Seco Camp, PT (1 ♂, USU). **Plumas:** Chilcoat, N. B. & W. M. Elliott (1 ♂, NYSU). **Riverside:** Anza, RMB (1 ♂). **San Bernardino:** Cronise Valley, JAP (1 ♂); Cronise Wash 15 mi. E Baker, WJP (1 ♂, WJP); Four Corners, R. W. Thorp (1 ♀, CIS); Kramer Hills, PDH, G. A. Marsh, ROS (3 ♂, 1 ♂, WJP); Yermo, collector unknown (1 ♀, CAS). **San Diego:** Borrego Valley, RMB (1 ♂), WJP (1 ♀, CAS: 1 ♂, WJP); Borrego State Park, MSW & J. S. Wasbauer (1 ♀, CSDA); Scissors Crossing, F. G. Andrews (1 ♀, UCR). **San Luis Obispo:** 10 mi. w Simmler, PDH (2 ♂, CIS).

Idaho. **Cassia:** 2.5 mi. S Malta, R. L. Westcott (1 ♀, UIM). **Franklin:** Preston, GEB (1 ♂, USU). **Fremont:** 6 mi. NW St.

Anthony, D. S. Horning (1 ♀, 3 ♂, UIM), R. L. Westcott (4 ♂, UIM); St. Anthony Sand Dunes, L. S. Hawkins (1 ♂, UIM), R. L. Westcott (1 ♂, UIM), N. B. & W. M. Elliott (5 ♀, 4 ♂, NYSU; 1 ♀, 1 ♂, WJP), Lincoln: 4.5 mi. E Dietrich, R. L. Westcott (1 ♀, UIM); Shoshone, R. W. Haegele (1 ♂, UIM).

Nevada. **Churchill:** 12 mi. NE Stillwater, FDP (3 ♂; 1 ♀, 2 ♂, USNM). **Humboldt:** Orovada, MEI (1 ♂); 10 mi. N Winnemucca, RMB (1 ♀). **Lyon:** Fernley, T. R. Haig (1 ♀); Yerington, R. W. Lauderdale (1 ♀). **Washoe:** Nixon, RMB, R. J. Gill, MEI, FDP, J. E. Slansky (8 ♀, 4 ♂), MEI (1 ♀, UCR), R. L. Westcott (2 ♀, 1 ♂, LACM); Patrick, FDP (1 ♀); 15 mi. E Reno, RMB, MEI, FDP (9 ♂); Wadsworth, FDP (2 ♀, 1 ♂); 2.8 mi. W Wadsworth, G. I. Stage (2 ♂, CAS).

Oregon. **Harney:** 21.5 mi. NW Fields sand dunes, R. L. Westcott (1 ♀, OSDA).

Utah. **Duchesne:** 5.5 mi. W Roosevelt, R. W. Thorp (1 ♂, CIS). **Emery:** Goblin Valley, FDP (2 ♀, USU). **Grand:** 25 mi. S Moab, GEB & R. Brumley (1 ♂; 3 ♂, USU; 1 ♂, WJP). **Millard:** 6 mi. N Delta, S. M. Hogue (1 ♀, UIM); 15 mi. N Delta, PFT (1 ♂, USU); 12 mi. NW Fillmore, FDP & Vincent (2 ♂, USU). **Washington:** Santa Clara, GEB (1 ♀, USU).

Wyoming. **Sweetwater:** 20 mi. W Farson, PFT (1 ♂, USU).

MEXICO

Lower California. Punta de Cabras (12 mi. W of km 180 S San Thomas), S. & S. Frommer (1 ♂).

Tachyspex papago sp.n.

ETYMOLOGY.—Named after the Papago Indians of Arizona.

DIAGNOSIS.—Like *psilocerus*, *papago* has the punctate mesopleuron, metapleuron, and propodeal side (propodeal side impunctate in some *psilocerus*), arecomesally unsculptured terga I and II (smooth part contrasting with remaining surface), and the largely brown or red female flagellum. Unlike *psilocerus*, the upper metapleuron of *papago* is simple, the metapleural flange is narrow, the malar space is absent, and the hindwing base is broad. The presence of erect setae on the midfemoral venter in *papago* (setae length about 1 DOA) is a subsidiary diagnostic feature.

GEOGRAPHIC DISTRIBUTION.—Southern Arizona.

MATERIAL EXAMINED.—HOLOTYPE: ♀, Arizona, Santa Cruz Co., Nogales, Apr. 1937, R. C. L. Perkins (BMNH).

PARATYPES: Arizona, same data as holotype (1 ♂, BMNH). **Cochise:** 5 mi. W Portal, 7 May 1977, collector unknown (1 ♂, NYSU); 6 mi. W Portal, 7 & 12 May 1973, A. L. Steiner (2 ♀, UAE, WJP).

Tachyspex solaris sp.n.

ETYMOLOGY.—The specific name *solaris* is Latin adjective meaning of the sun; it refers to the sunny habitats in which the species occurs.

DIAGNOSIS.—Most *solaris* can be recognized by the uniformly yellowish humeral plate of the forewing base (the median plate is usually contrastingly dark), but in some specimens the plate is partly dark. In other species the humeral plate is all dark or with a dark spot at the middle. Subsidiary diagnostic features of *solaris* are: small size (body length 5–7.5 mm); clypeal free margin shallowly concave between lobe and orbit; vestiture largely concealing mesopleural integument; setae oriented mainly transversely on propodeal dorsum; and densely pubescent male sterna.

GEOGRAPHIC DISTRIBUTION.—Xeric areas of southern California and adjacent areas of Nevada and Arizona.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, San Diego Co., Borrego Valley, 20 Apr. 1957, R. C. Bechtel (UCD).

PARATYPES: 59 ♀, 26 ♂, 2 Apr. to 17 June.

Arizona. **Mohave:** 8 mi. E Mesquite (Nevada), FDP & PFT (1 ♀, USU). **Pinal:** 5 mi. NW Coolidge, A. D. Telford (2 ♂, UCD). **Yuma:** 6 mi. SE Parker, S. A. Gorodenski, JMD, MAC (1 ♀, ASU); 8 mi. SE Parker, J. H. & J. M. Davidson, MAC (3 ♀, UCD); 15 mi. E Yuma, PFT, FDP, GEB (1 ♀, USU); 18 mi. NE Yuma, FGW & GDB (1 ♂, UCD).

California. **Imperial:** Glamis, F. G. Andrews (1 ♀, CSDA; 1 ♀, WJP); Pinto Wash, FXW (3 ♂, CAS); Palo Verde, RMB (1 ♂, UCR), MSW (1 ♀, 1 ♂, CSDA; 1 ♂, WJP). **Inyo:** 13 mi. S Death Valley Junction, LAS & ASM (1 ♂, UCD); Lone Pine, RMB (1 ♀, UCD); 2 mi. E Lone Pine, RMB (1 ♂, UCD), 15 mi. S Panamint Springs, PDH (2 ♀, 2 ♂, UCD); Owens Lake, M. S. & J. S. Wasbauer (3 ♀, CSDA). **Riverside:** 18 mi. W Blythe, FDP (2 ♀, UCD), WJP (23 ♀, 3 ♂, CAS); Hopkins Well, PDH (1 ♀, UCD); Thousand Palms, FDP (1 ♂, UCD). **San Bernardino:** Bagdad, JAP (2 ♂, CIS); Colton Hills, TG (1 ♀, TG), Cronise Valley, FDP (2 ♀, UCD); Kelso, N. J. Smith (1 ♀, UCD); 7 mi. SW Kelso, M. S. & J. S. Wasbauer (1 ♂, CSDA); 10 mi. E Twentynine Palms, collector unknown (1 ♂, CSDA). **San Diego:** Borrego Valley, RCB, JCH, H. R. Moffitt, EIS (6 ♀, 1 ♂, UCD; 2 ♀, USNM; 2 ♀, 1 ♂, WJP); FXW (2 ♀, 2 ♂, CAS).

Nevada. **Clark:** Glendale, FDP & PFT (1 ♀, 1 ♂, USU); 20 mi. W Glendale, FDP & PFT (1 ♀, USU).

Tachyspex spatulifer sp.n.

ETYMOLOGY.—The specific name *spatulifer* is a combination of the Latin word *spatula*, a broad, flat tool for stirring or mixing, and the suffix -fer, a bearer; with reference to the female clypeus.

DIAGNOSIS.—The female of *spatulifer* has a distinctive clypeus; the lip is broadened mesally, usually variably, obtusely dentate (including one median tooth). The clypeus is somewhat similar in *crenulatus*, *musciventrif*, *arizonac*, and *la-*

mellatus, but unlike the former two species the clypeal lip of *spatulifer* is not emarginate mesally, and unlike the latter two the middle scutal setae are oriented posterad and the mesopleuron is impunctate.

The male of *spatulifer* shares with *crenulatus* the following diagnostic combination of characters: clypeal lip triangular, middle scutal setae oriented posterad, mesopleuron impunctate, sterna evenly punctate, with nonvelvety pubescence. Unlike *crenulatus*, the trochanteral punctures of *spatulifer* are subcontiguous, the lip corners are oriented closer to the orbit than to each other, and often the propodeal side is coarsely ridged, the gastral apex is black, and the frontal vestiture is golden.

GEOGRAPHIC DISTRIBUTION.—Washington to California, east to southern Idaho and northern Utah.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, Monterey Co., Arroyo Seco Camp, 11 May 1959, A. S. Menke (UCD).

PARATYPES: 53 ♀, 85 ♂, 10 Apr. to 25 June (California, Idaho, Oregon), 5–11 Aug. (Utah, Washington). Specimens for which institution is not indicated below are kept in UCD.

California. **Alameda:** 1 mi. E Mission Peak, W. W. Middlekauf (1 ♀, 6 ♂, 1 ♂, CIS). **Amaador:** Volcano, RMB (1 ♂). **Contra Costa:** Mt. Diablo, RMB (4 ♂; 1 ♂, WJP), J. G. Rozen (1 ♂), collector unknown (1 ♂; 1 ♂, USU); Las Trampas Ridge (w Danville), FXW (1 ♀, 1 ♂, CIS). **Eldorado:** Placerville, GEB (1 ♀), D. J. Burdick (1 ♂, CIS). **Fresno:** Deer Cove Cr., TG (1 ♀, TG); Watts Valley, B. J. Adelson (1 ♀, CIS). **Kern:** Glennville, RMB (2 ♀); Tejon Canyon, E. C. VanDyke (1 ♀); 1 mi. E Woody, JAP, C. A. Toschi (2 ♂, CIS). **Lake:** N. Fork Cache Cr. × Hwy. 20, ME1 (1 ♂). **Mariposa:** El Portal, RMB (1 ♂); Indian Flat, RMB (1 ♀). **Mendocino:** Mendocino, S. F. Cook (1 ♀, CIS). **Monterey:** Arroyo Seco Camp, RCB, RMB, D. J. Burdick, HKC, C. Goodpasture, FDP, LAS, PFT, BV (8 ♀, 21 ♂; 2 ♀, 5 ♂, UCR; 2 ♀, 5 ♂, USNM; 4 ♂, USU; 3 ♀, 3 ♂, WJP); Monterey, FDP (1 ♀, 3 ♂). **Napa:** Samuel Springs, RCB (1 ♂). **Placer:** 4 mi. s Rocklin, MSW, P. Adams (1 ♀, 2 ♂, CSDA). **Riverside:** Pinyon Flat, San Jacinto Mts., E. C. VanDyke (1 ♀). **Sacramento:** Folsom, RMB (1 ♀), MSW (1 ♂, CSDA); 10 mi. NE Folsom, MSW (3 ♂); N Sacramento, PDH (7 ♂, CIS). **San Diego:** Sorrento, JAP (1 ♀, CIS). **San Luis Obispo:** 2.5 mi. Creston, C. A. Toschi (1 ♀, CIS); La Panza Camp, 12 mi. NE Pozo, JAP, R. W. Thorp (2 ♀, CIS); Pozo, PDH, JAP, C. A. Toschi (2 ♀, 2 ♂, CIS); 3 mi. E Pozo, S. W. Thorp (1 ♂, CIS); 5 mi. E Santa Margarita, W. S. & E. S. Ross (1 ♀, CAS). **Santa Clara:** Mt. Hamilton, collector unknown (1 ♀); Los Gatos, J. A. Kusche (1 ♀). **Siskiyou:** Windy Camp, TG (1 ♂, TG). **Solano:** Mix Canyon, R. B. & L. S. Kimsey (1 ♂). **Stanislaus:** 3.2 mi. w Hwy. 120 on Evergreen Road, R. W. Brooks (1 ♀). **Tulare:** Camp Wishon, TG (2 ♀, TG); Sequoia National Park, "Ash Mt. R.," EIS (1 ♂); Tule River Indian Reservation, R. P. Allen (1 ♀, CAS); Wood Lake, N. W. Frazier (1 ♀). **Tuolumne:** 4 mi. E Sonora, J. G. Rozen (1 ♀).

Yolo: Bear Cr. and Cache Cr. junction, ASM (1 ♀); Davis, FDP, EIS (3 ♀, 1 ♂); Rumsey, ASM (1 ♀).

Idaho. Oneida: Black Pine Canyon, Malaise trap (1 ♀, 1 ♂, USU).

Oregon. Umatilla: Athena, K. Gray & J. Schuh (1 ♀).

Utah. Cache: W. Hodges Canyon, Knowlton & Hanson (1 ♀, USU).

Washington. Pacific: Nahcotta, collector unknown (1 ♀, CIS).

Tachysphex verticalis sp.n.

ETYMOLOGY.—The specific name *verticalis* is derived from vertex, which is unusually narrow in this species.

DIAGNOSIS.—*Tachysphex verticalis* resembles many species of the *brullii* group (such as *belfragei* or *mundus*) in having a longer than wide vertex (as long as wide in some females) and a fine thoracic sculpture. Unlike these species, the propodeal dorsum setae of *verticalis* are inclined obliquely anterad, and the female tarsomere V is simple (apicoventral margin not produced into a lobe, claws short, not prehensile). *T. verticalis* differs from other species of the *pompiliformis* group in having a uniformly microareolate, impunctate mesopleuron and propodeal side, and the contrastingly ridged propodeal hindface. The markedly convex middle clypeal section is also distinctive. Like *crenulatus* and *glabrior*, the lip of the female clypeus has two lateral incisions on each side, but unlike these species the vertex has a shiny, median sulcus which extends posterad from the postocellar impression. The male differs from other species of the group by its longer than wide vertex; like *glabrior*, *idiotrichus*, and *irregularis*, sterna III–VI have graduli.

GEOGRAPHIC DISTRIBUTION.—Northern Mexico, southern Arizona and southwestern New Mexico, California and adjacent areas of northern Nevada; also isolated in Idaho and Utah.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, Riverside Co., 9 mi. w Beaumont, 29 July 1957, J. E. Gillaspay (UCD).

PARATYPES: 78 ♀, 165 ♂, 24 May to 5 Oct., mostly UCD, but also AMNH, CAS, CIS, CSDA, HKT, KU, LACM, MCZ, NYSU, UAT, UCR, UIM, USNM, WJP.

UNITED STATES OF AMERICA

Arizona. Cochise: Box Canyon (Chiricahua Mts.), RMB (1 ♀, 6 ♂); Portal, H. & M. Townes (1 ♂); Skelton Canyon, 6 mi. SE Apache, PDH (1 ♂). **Gila:** Gila R. 3 mi. SW Christmas, FGW (2 ♀, 1 ♂). **Pima:** Baboquivari Mts., O. C. Poling (1 ♂); Gates Pass, D. Graham (1 ♀); 2 mi. E Robles Pass, D.

Graham (2 ♀, 1 ♂); Sabino Canyon, GEB, RMB, FDP, LAS (2 ♀, 5 ♂); Tanque Verde, FGW (1 ♂); Tucson, FDP, LAS (2 ♂).

California. Alameda: Tesla, J. E. Gillaspay (3 ♀). **Butte:** 1 mi. NE Pulga, R. L. Langston (2 ♂, CIS). **Inyo:** Antelope Springs (8 mi. SW Deep Springs), RMB, HCC, T. H. Gantenbein, EEG, PMM, JAP (1 ♀, 8 ♂, CAS; 1 ♂, CIS; 1 ♀, 10 ♂), JAP, G. I. Stage (3 ♂, CIS); 3 mi. W Big Pine, LAS (1 ♀); Big Pine Cr., RMB, ROS (2 ♂); 10 mi. N Bishop, RMB (1 ♂); Lone Pine Cr., RMB, EEG (2 ♀). Westgard Pass, H. B. Leech (1 ♂, CAS); 4 mi. W Westgard Pass, H. V. Daly (1 ♀, CIS). **Kern:** 2 mi. W Frazier Park, JAP (1 ♂, CIS); Kernville, D. E. Hardy (1 ♂, KU). **Lassen:** Hallelujah Junction, RMB (1 ♂). **Los Angeles:** Camp Baldy, W. A. McDonald (1 ♂, LACM); Crystal Lake Road, RMB (1 ♂); Elizabeth Canyon, EIS (1 ♂); La Crescenta, RMB (1 ♂); Mount Wilson Road, RMB (1 ♀, 1 ♂); Monrovia, R. Rosay (1 ♀); Sangus, collector unknown (1 ♀, NYSU); Santa Susana Pass, MEI (2 ♂); Tanbarck Flat, RMB (3 ♂), FXW (1 ♀, 2 ♂, CAS). **Mariposa:** Jerseydale, P. D. Levin (1 ♂, UIM). **Monterey:** Mill Cr. (Santa Lucia Mts.), EIS (1 ♂); Paraiso Springs, L. S. Slevin (2 ♀); 4 mi. S San Ardo, P. E. Paige (2 ♂); 4 mi. W Soledad, G. R. Ballmer (1 ♀, UCR). **Orange:** Upper Trabuco Canyon, E. M. Fisher (1 ♀). **Placer:** Lake Tahoe, collector unknown (1 ♀). **Riverside:** Anza, RCB (1 ♀); Banning, JCH (1 ♀); 9 mi. W Beaumont, J. E. Gillaspay, JCH, H. R. Moffitt (3 ♀, 9 ♂); Pinyon Flat, P. H. Arnaud (1 ♂, CAS); Riverside, JCH (2 ♀, UCR); San Timoteo Canyon, MSW, R. McMaster, A. Hardy, J. Slansky (5 ♀, 12 ♂); Whitewater, M. J. Stebbins (1 ♂). **San Bernardino:** Cajon, RCB, RMB, H. R. Moffitt (5 ♂); Cajon Junction, D. Burnett (1 ♀); Hole-in-the-Wall (Providence Mts.), TG (1 ♂, TG); Mill Cr. Canyon, JCH (2 ♀); Oak Glen, TG (1 ♀, 1 ♂, TG); Upper Santa Ana R., A. L. Melander (1 ♀); Wildwood Canyon, H. R. Moffitt (1 ♂); 3 mi. SE Yucaipa, TG (1 ♂, TG). **San Diego:** Laguna Mts. road, FXW (1 ♂, CAS); La Jolla, K. Corwin, P. Adams (1 ♀, 2 ♂), J. C. Bridwell (1 ♂); Julian, H. R. Moffitt (2 ♂), FXW (1 ♂, CAS); Poway, F. Blaisdell (1 ♂); San Diego, H. E. & M. A. Evans (2 ♀), H. A. Hill (1 ♂); Scissors Crossing, EIS (1 ♂); Sorrento, JAP (1 ♀, CIS); 9 mi. S Warner Springs, RMB (3 ♂). **San Luis Obispo:** Creston, L. E. Guenther (1 ♂); Nacimiento Dam, JAP (1 ♀, CIS); 3 mi. SW Paso Robles, R. L. Langston (1 ♀, CIS). **Santa Barbara:** Bluff Camp (San Rafael Mts.), PMM, FDP (3 ♀); 3 mi. W Cuchuma Lake, RMB, P. E. Paige, FDP, J. R. Russel (4 ♂), W. A. Steffan (2 ♀, CIS); Los Prietos, J. S. Buckett (1 ♂), JAP (1 ♂, CIS); Santa Ynez Mts., RMB, PMM, ASM, FDP (6 ♂). **Santa Clara:** Santa Antonio Valley, 3.5 mi. N Del Puerto Canyon road, JAP (1 ♀, CIS). **Shasta:** Hat Cr. P.O., E. E. Lindquist (1 ♀, CIS); Redding, T. R. Haig (1 ♂). **Stanislaus:** Del Puerto Canyon, RMB, N. J. Smith (3 ♀, 3 ♂), BV (3 ♀, 4 ♂). **Trinity:** Junction City, T. R. Haig (1 ♀, 1 ♂), 3 mi. W Weaverille, DRM (1 ♀, UCD). **Tulare:** Three Rivers, H. R. Moffitt (1 ♂, UCR). **Ventura:** Foster Park, RMB, ASM (2 ♂); Sespe Canyon, PMM, FDP, RMB (3 ♂), W. A. Steffan (1 ♂, CIS). Also: County unknown, Oak Grove, J. Wilcox (1 ♂, OSU).

Idaho. Owyhee: 2 mi. SW Murphy, D. S. Horning, DRM (1 ♂).

Nevada. Douglas: 3 mi. S Genoa, RMB (1 ♀, 3 ♂); Minden, RCB, RMB (7 ♀, 1 ♂). **Storey:** Geiger Summit, W. H. Lange (1 ♂). **Washoe:** 54 mi. SW Gerlach, FDP (4 ♂).

New Mexico. Hidalgo: Granite Gap, 18 mi. N Rodeo, RMB (2 ♀, 3 ♂, AMNH; 3 ♀, 2 ♂, UCD).

Utah. Grand: Moab, GEB (1 ♀). **Washington:** Leeds Canyon, G. F. Knowlton (1 ♀, USU).

MEXICO

Lower California. 10 mi. E Bahía San Quintin, FXW (1 ♀, CAS); 4 mi. S La Rumorosa, MEI (1 ♀, 1 ♂, UCR); 4 mi. WSW Miraflores, J. Slansky, M. K. & C. Wasbauer (1 ♀, 2 ♂); San Quintin, FXW (1 ♂, CAS).

Sonora. Cocorit, FDP (1 ♂, UCD).

Tachyspex yolo sp. n.

ETYMOLOGY.—Named after Yolo County, California, where the holotype was collected.

DIAGNOSIS.—*Tachyspex yolo* is characterized by the transversely oriented middle scutal setae, sternum I with a horizontal depression at apex, and the usually punctate mesopleuron (punctures indistinct in some individuals). Other species share this combination of characters, but the female of *yolo* has a distinctive clypeus and sternum II: the dense clypeal punctation attains the lip base laterally, so that the sparsely punctate, apical area does not extend laterad to the lip corner level (its width is about 0.5–0.8 of the lip foremargin); the micropunctation of sternum II is absent along the midline from the base (or near base) to apex. In the other species, the dense punctation does not attain the lip base, and the sparsely punctate, apical area is as wide as the lip or nearly so; and the micropunctation of sternum II is usually absent only from an apicomedian, triangular area. The male resembles *lamellatus* and *sonorensis* in having nonvelvety sternal pubescence, but unlike these species its clypeal lip is not triangular. Unlike most *lamellatus*, the hypostomal carina of *yolo* is not lamelliform, and unlike the male of *sonorensis*, the flagellomeres III and IV are about equal in length. Subsidiary recognition features are: mesopleural punctures subcontiguous, ridges of propodeal side evanescent in many specimens.

MATERIAL EXAMINED.—**HOLOTYPE:** ♂, California, Yolo Co., Davis, 4 June 1961, F. D. Parker (UCD).

PARATYPES: 312 ♀, 414 ♂, 1 Apr. to 14 Oct. Specimens for which institution is not indicated are all in UCD.

UNITED STATES OF AMERICA

Arizona. Cochise: Bowie, A. D. Telford (3 ♀); Willcox, RMB, PDH, D. D. Linsdale (2 ♀, CIS; 10 ♀, 4 ♂; 2 ♀, USNM); 1 mi. S Willcox, FGW, E. Erickson (1 ♀, UAT); 3.5 mi. S Willcox, E. G. Linsley (1 ♀, CIS). **Cocino:** Moenkopi, RMB (1 ♀); 3 mi. SE Moenkopi, ASM & WJP (1 ♂, WJP); 4.5 mi. E Moenkopi, J. M. & M. A. Davidson & MAC (3 ♀, ASU). **Graham:** S side of San Carlos Reservoir, D. & J. Schuh (1 ♂, OSU). **Maricopa:** Gila Bend, GDB (2 ♀); 5 mi. W Gila

- Bend, GDB & FGW (1 ♀); 20 mi. s Gila Bend, R. H. & E. M. Painter (1 ♂, UAT); Sentinel, GDB (3 ♀). **Mohave**: 4 mi. w Chloride, GEB, PFT, FDP (3 ♀, 5 ♂, USU); 9 mi. e Oatman, same collectors (5 ♀, 1 ♂, USU); 16 mi. n Wikeup, FGW & GDB (1 ♂). **Navajo**: Jadito Trade Post, J. H. & J. M. Davidson & MAC (1 ♀, ASU). **Pima**: Tucson, GDB (2 ♀, 1 ♂, UAT), G. & A. Ferguson (1 ♀), R. X. Schick (1 ♀, LACM). **Pinal**: 3 mi. w Oracle, FDW, Bequaert, Holler (1 ♂, UAT); Sacaton, A. D. Telford (1 ♀, 1 ♂). **Yavapai**: 8 mi. n Aguila, FDP (1 ♀, USU). **Yuma**: e Aztec, FGW & GDB (2 ♀); Dateland, GDB & FGW (1 ♂); Parker, J. M. & J. H. Davison (1 ♀, 2 ♂); 8 & 18 mi. se Parker, J. H. & J. M. Davidson & MAC (3 ♀, ASU); 8 mi. se Parker, S. A. Goro-denski & JMD (1 ♂, ASU), J. Heddock (1 ♀, CIS); 12 mi. s Parker, MAC & M. A. Mortenson (1 ♀, CIS); nw Vicksburg, FGW & GDB (2 ♀, 1 ♂); Yuma, FGW & GDB (1 ♂); 15 mi. e Yuma, PFT, FDP, GEB (1 ♀, USU); 21 mi. n Yuma, MEI (1 ♀).
- California**. **Alameda**: Arroyo Valle, W. J. Turner (1 ♀, CIS). **Colusa**: 2 mi. e Colusa, MSW (1 ♀). **Eldorado**: Chile Bar, L. W. Quate (1 ♀). **Fresno**: 25 mi. e Fresno, PFT (2 ♂, USU). **Imperial**: Chocolate Mts., Ogilby road, 3 mi. s Junction Hwy. 78, MSW (9 ♀, CSDA); Glamis, FDP (1 ♂); 20 mi. e Glamis, FDP (1 ♀); Palo Verde, RMB, EEG, ROS (3 ♀, 2 ♂), MSW (1 ♀, 1 ♂, CSDA); 3 mi. s Palo Verde, C. A. Toschi (1 ♀, CIS); Pinto Flat, FXW (1 ♀, CAS); Pinto Wash, FXW (1 ♂, CAS); 20 mi. w Yuma, PFT & FDP (1 ♀, USU). **Inyo**: Antelope Springs (8 mi. sw Deep Springs), RMB, HKC, T. H. Gantenbein (6 ♀, 3 ♂; 6 ♀, 11 ♂, CAS), PDH (6 ♀, 13 ♂, CIS), JWMS (1 ♀, CIS), JAP (1 ♂, CIS); Big Pine, C. D. Michener (1 ♂, KU); Darwin Falls, RMB, EEG (1 ♀, 1 ♂); 3.5 mi. s Death Valley Junction, N. L. Rump (1 ♀); 13 mi. s Death Valley Junction, LAS (1 ♂); Deep Springs, RMB, BV (2 ♀, 3 ♂), MSW, MSW & J. Slansky (2 ♀, 13 ♂, CSDA; 1 ♂, WJP); Eureka Valley, D. Giuliani (1 ♀, CSDA); 1 mi. n Lone Pine, MEI (1 ♀, 1 ♂, UCR); 2 mi. e Lone Pine, RMB, EEG (2 ♀, 9 ♂); Owens Lake, MSW & F. G. Andrews (2 ♀, CSDA); Panamint Springs, PMM (1 ♀), FDP (1 ♂); West-gard Pass, H. V. Daly (1 ♂, CIS); Wyman Canyon (White Mts.), HKC (1 ♂, CAS). **Kern**: Johannesburg, EIS (1 ♀); Kernville, T. R. Haig (1 ♀). **Lake**: N. Fork Cache Cr. × Hwy. 20, D. Q. Cavagnaro (1 ♀). **Lassen**: Hallelujah Junction, MEI (2 ♂, UCR). **Los Angeles**: Huntington Park, A. Bauman (1 ♀); 8 mi. n Llano, JCH, EIS (3 ♀). **Mendocino**: Navarro, N. B. & W. M. Elliott (4 ♂, NYSU); Navarro R. × Hwy. 128, Hedy Groves State Park, MSW (9 ♀, 13 ♂, CSDA; 1 ♀, 2 ♂, WJP); Robinson Cr. (4 air mi. sw Ukiah), TG (3 ♂, TG). **Monterey**: Fort Ord, HKC (1 ♂, UCD); Monterey, FDP, L. S. Slevin (3 ♂); Soledad, RMB (3 ♂). **Modoc**: Adin Pass, T. R. Haig (1 ♀, CSDA). **Mono**: Benton Inspection Sta., RMB (1 ♂); Paradise Camp, FDP (1 ♂). **Plumas**: Chilcoot, N. B. & W. M. Elliott (1 ♀, 5 ♂, NYSU); Halsted Campground (E. Branch N. Fork Feather R.), P. H. Arnaud (1 ♀, 1 ♂, CAS). **Riverside**: Andreas Canyon, RMB (2 ♂); Anza, RMB (2 ♀, 2 ♂); 8 mi. e Banning, R. R. Snelling (1 ♂, LACM); 9 mi. w Blythe, JWMS (1 ♀, CIS); 18 mi. w Blythe, RMB, JCH, D. S. Horning, FDP (1 ♀, 4 ♂; 2 ♀, WJP), WJP (1 ♂, CAS); 5 mi. n Desert Center, C. D. MacNeill (2 ♀, CIS); 17 mi. e Desert Center, Rosen & Schrammel (1 ♀); 5 mi. s Hemet, RMB (1 ♀); Indio, PDH (1 ♂), MEI (1 ♀, UCR); Joshua Tree National Monument, PFT (2 ♂, USU); Palm Springs, JWMS (1 ♀); 2 mi. e Palm Springs, EIS (1 ♀); Riverside, JCH (1 ♂), EIS (1 ♂, UCR); Tecumela, EIS (1 ♂); Thousand Palms, RMB, EEG, H. R. Moffitt, FDP (3 ♀, 9 ♂), W. R. Richards (1 ♀, CNC); Whitewater, JWMS (1 ♀); Wiley Well, RMB (1 ♂). **Sacramento**: Grand I., MSW (1 ♀, CSDA); Sacramento, RMB, FDP (3 ♂), MSW (4 ♂, CSDA); Sacramento (Sacramento R. Levee), MSW (1 ♂), MSW & F. G. Andrews (2 ♂, CSDA). **San Benito**: Pinnacles, PDH (1 ♂, CIS). **San Bernardino**: 1 mi. s Adelanto, MEI (1 ♀); 10 mi. s Adelanto, J. A. Froebe (1 ♂); Bagdad, JAP (1 ♂, CIS); 4 & 14 mi. s Baker, M. S. & J. S. Wasbauer (2 ♂, CSDA); Cottonwood Wash, TG (2 ♀, TG); Cronise Valley, FDP (1 ♀); Cronise Wash (15 mi. e Baker), WJP (2 ♀, 5 ♂, CAS); 12 mi. se Ivanpah, PDH (1 ♀, 1 ♂); Joshua Tree National Monument, TG (1 ♂, TG); Kelso Dunes, TG (4 ♀, TG); Kelso Mts., TG (1 ♂, TG); Kramer Hills, G. A. Marsh (1 ♂, CIS), ROS (1 ♀); 3 mi. s Kramer Junction, MEI (2 ♂); 14 mi. s Kramer Junction, JWMS (1 ♀); 20 mi. w Landers, PFT & N. Youssef (1 ♂, USU); 12 mi. ese Tecopa, MSW, T. Eichlin (1 ♀, CSDA); 22 mi. n Manix, G. A. Marsh (1 ♀); 2 mi. w Phelan, EIS (2 ♂); 14 mi. w Rice, C. D. MacNeill (1 ♂, CIS); Twentynine Palms, R. R. Pinger (1 ♂, CSDA); 32 road mi. e Twentynine Palms, TG (1 ♀, 1 ♂, TG); Vanwinkle Spring, G. E. Wallace (1 ♂); 11 mi. e Yermo, JWMS (1 ♀, CIS). **San Diego**: 8 mi. e Banner, JAP (2 ♂, CIS); Borrego Valley, RMB, EEG, PDH, FDP, EIS, MSW (19 ♀, 29 ♂; 2 ♂, WJP), MEI (2 ♂, UCR), G. A. Marsh (1 ♀, CIS), MSW, J. Slansky, Adams (1 ♀, 4 ♂, CSDA), MSW (1 ♀, 4 ♂, CIS), FXW (2 ♀, 29 ♂, CAS); Del Mar, C. H. Frady (1 ♀, OSU); 1 mi. s Del Mar, PDH (2 ♀, CIS); between Ocotillo & Borrego, A. R. Moldenke (2 ♂, LACM); Scissors Crossing, EIS (2 ♀), MSW (1 ♀, CSDA); Sorrento, JAP (1 ♀, 7 ♂, CIS); 2 mi. n Warner Springs, B. M. Bartosh, RCB (3 ♀, 2 ♂). **San Luis Obispo**: Black Lake Canyon, RMB (1 ♀, 1 ♂); 10 mi. w Simmler, PDH (2 ♂, CIS). **San Mateo**: 10 mi. sw San Francisco, W. Bohart (1 ♀, USU). **Santa Barbara**: 3 mi. w Chuchuma Lake, P. E. Paige (1 ♀). Los Prietos, J. S. Buckett (1 ♂), JAP (1 ♀, CIS); 2 mi. e Solvang, JAP (1 ♀, CIS). **Santa Clara**: San Jose, PFT (1 ♀, USU). **Siskiyou**: between Hawkinsville & Lona Gulch, BV (1 ♀, CSDA). **Sutter**: Nicolaus, MSW (1 ♀, 17 ♂, CSDA). **Trinity**: Hayfork Agricultural Inspection Sta., JAP (2 ♂, CIS); Junction City, T. R. Haig (2 ♀, 1 ♂, CSDA). **Ventura**: Foster Park, J. L. Bath (1 ♀, UCR), J. R. Russell (1 ♀); Ventura, J. R. Russell (1 ♀). **Yolo**: Capay, R. E. Rice (1 ♀); Davis, RMB, C. G. Moore, C. R. Kovacic, ASM, L. R. Nault, FDP, WJP, LAS (12 ♀, 28 ♂; 2 ♂, USNM; 2 ♀, 3 ♀, WJP); 3 mi. s Davis, R. R. Snelling (1 ♂, LACM); Putah Canyon, FDP (1 ♀, 2 ♂); Rumsay, RMB (1 ♂). AMS & LAS (1 ♀, 1 ♂, LACM).
- Idaho**, **Franklin**: Preston (1 ♀, USU). **Fremont**: St. Anthony Sand Dunes, N. B. & W. M. Elliott (1 ♀, 1 ♂, NYSU). **Lincoln**: 6 mi. ne Shoshone, A. R. Gittins (♂, UIM).
- Nevada**. **Churchill**: 23 mi. e Fallon, E. G. Linsley (1 ♀); 3 mi. w Hazen, ASM (1 ♀), 4 mi. e Hazen, MEI (1 ♂, UCR); Sand Mt. (9 mi. Frenchman), J. Doyen (1 ♀, CIS). **Clark**: Jean, GEB (1 ♀); 9 mi. sw Mesquite, RCB (10 ♀, 6 ♂); 30 mi. s Searchlight, PFT, Rust, Youssef (1 ♂, USU); Valley of Fire, PFT, FDP, GEB (1 ♂, USU). **Humboldt**: 10 mi. n Winnemucca, EEG (1 ♀). **Lyon**: Weeks, FDP (1 ♀). **Mineral**: Luning, R. F. Denno & DRM (2 ♂); 3 mi. se Schurz, FDP (1 ♂). **Pershing**: Woolsey, T. R. Haig (2 ♀, UCR). **Washoe**: Nixon, RMB, FDP (1 ♀, 4 ♂), MEI (1 ♂, UCR); Patrick, FDP (1 ♂).
- New Mexico**. **Dona Ana**: Las Cruces, RMB (1 ♀, 2 ♂), R. H. Beamer (1 ♀, KU); 4 mi. e Mesilla Park, PDH (1 ♂, CIS). **Lincoln**: 5 mi. s Oscuro, R. L. Westcott (1 ♀, UIM). **Otero**: Alamogordo, collector unknown (1 ♀, CU); White Sands National Monument, H. V. Weems (1 ♀, FSCA). **Socorro**: La

Joya, 20 mi. N Socorro, H. E. Evans (6 ♀, 3 ♂, CSU).

Valencia: Acoma Pueblo, ASM & WJP (1 ♀, WJP).

Oregon: **Deschutes:** Smith Rock State Park, M. B. & W. M. Elliott (8 ♀, 15 ♂, NYSU). **Josephine:** 8 mi. w Grants Pass, R. L. Westcott (1 ♀, ODA). **Klamath:** Bonanza, J. Schuh (1 ♀). **Morrow:** Boardman, G. R. Ferguson (2 ♂). **Umatilla:** Hat Rock State Park, EIS (1 ♀).

Texas: **Hudspeth:** McNary, H. E. Evans (2 ♀, 1 ♂, CSU); Sierra Blanca, RMB (1 ♀). **Presidio:** 5 mi. E Presidio, D. S. Horning (1 ♂).

Utah: **Cache:** Cornish, GEB & PFT (5 ♀, 2 ♂, USU; 2 ♀, WJP). **Emery:** Goblin Valley, FDP (1 ♂, USU). 2 air mi. w Little Gilson Butte, TG (1 ♂, USU). **Juab:** 12 mi. s Eureka, JWMS (1 ♀, CIS); White Sand Dunes (25 mi. sw Eureka), W. F. Barr (1 ♂, UIM). **Millard:** 15 mi. n Delta, PFT (1 ♂, USU); Pahvant (near Flovelli), GEB & E. A. Cross (1 ♂, UCD). **San Juan:** 6 mi. s La Sal Junction, R. W. Thorp (1 ♂); 25 mi. s Moab, GEB, R. Brumley (2 ♀, 1 ♂; 1 ♀, USU). **Washington:** Leeds Canyon, G. F. Knowlton, W. J. Hanson, T. H. Hsiao (1 ♀, 2 ♂, USU).

MEXICO

Lower California: 10 mi. E Bahía San Quintin, FXW (1 ♂, CAS); Descanso, RMB (1 ♀); El Pescadero, MSW, J. Slansky (3 ♀, 6 ♂, CSDA); La Paz, FXW (2 ♂, CAS); Los Barriles, MSW (3 ♀, CSDA); 20 mi. N Mesquital, Ross & Bohart (1 ♀); Progreso, Sierra Juárez, FXW (1 ♀, 3 ♂, CAS); 38 km s Rosarito (114°), E. Fischer, R. Westcott (1 ♀, CAS); San Carlos, H. E. Evans, W. Rubink & D. Gwynne (4 ♀, CSU); 3 mi. N San Felipe, MEI (3 ♀, 1 ♂, UCR); 15 mi. N San Ignacio, Ross & Bohart (1 ♀); 10 mi. s San Quintin, J. Slansky, M. & K. Washauer (1 ♀, CSDA); San Vicente, C. H. Frady (1 ♀, OSU), JAP (1 ♀, CIS).

Chihuahua: Moctezuma, JWMS (1 ♂, CIS); Samalayuca, RMB (2 ♀).

Sinaloa: 8 mi. s Elota, LAS (1 ♂).

Sonora: Cerro Pinacate, McDougal Crater, GDB (1 ♂, UAT); Guaymas, E. P. VanDuzee (1 ♀); 39 mi. s Puerto Peñasco, M. Leppia, J. Bigelow, MAC, J. Davidson (1 ♀, ASU); "Sonora, 85 km. so.," A. L. Melander (1 ♀, 6 ♂); Tepoca Bay, E. P. VanDuzee (1 ♀).

Tachyspex yuma sp.n.

ETYMOLOGY.—Named after the Yuma Indians of Arizona.

DIAGNOSIS.—*Tachyspex yuma* is characterized by the punctate mesopleuron (punctures shallow), middle scutal setae oriented posterolaterad or (some males) posterad, and sternum I with an apical depression. Several other species share this combination of characters, but they have a uniformly ridged propodeal side (ridges evanescent in many *yolo*). In *yuma*, the propodeal side is either coarsely ridged posteriorly and microridged along the metapleural sulcus; or (most specimens) nonridged along the metapleural sulcus and ridged along the dorsal margin (or dorsal and posterior); or (some males) all nonridged. Furthermore, the flagellum

of *yuma* is somewhat longer; for example, the length of flagellomere IV is 3.6–4.2 (female) and 2.0–2.4 (male) times its width, and up to 3.2 and 2.0 times, respectively, in the other species. In the male, the unusually broad clypeal lobe is distinctive (corners markedly closer to orbits than to each other) and the velvety sternal pubescence is an additional recognition feature.

GEOGRAPHIC DISTRIBUTION.—Idaho, Oregon, California, Arizona, southern Texas, northern Mexico (Sonora, Lower California).

MATERIAL EXAMINED.—**HOLOTYPE:** ♂, Mexico, Baja California Sur, La Paz, 10–12 Oct. 1954, F. X. Williams (CAS Type No. 13966).

PARATYPES: 8 ♀, 25 ♂, 2 Mar. (Sonora), 8 Apr. to 1 June, 14 July (Oregon), 9–15 Oct., 11 Nov.

UNITED STATES OF AMERICA

Arizona: **Cochise:** Canelo, A. & H. Dietrich (1 ♀, NYSU); 5 mi. w Portal, collector unknown (2 ♂, NYSU); 6 mi. w Portal, A. L. Steiner (2 ♂, UAE, WJP). **Maricopa:** Wickenburg, PFT & GEB (1 ♂, WJP). **Coconino:** Grand Canyon National Park, 15 mi. NE Phantom Ranch, J. E. Slansky (1 ♂, UCD).

California: **Imperial:** 20 mi. E Glamis, FDP (1 ♂, UCD). **Inyo:** Darwin Falls, ASM (1 ♂, UCD); Panamint Springs, MEI (1 ♂, UCD); Surprise Canyon, FDP (2 ♂, UCD, WJP). **Riverside:** Boyd Desert Research Center, 4 mi. s Palm Desert, PDH (1 ♀, 1 ♂, CIS; 1 ♀, WJP); Deep Canyon, MEI (3 ♂, UCD, UCR, WJP), EIS (1 ♂, UCD); Salton Beach, A. L. Melander (1 ♀, UCD); Thousand Palms Canyon, RMB (1 ♂, UCD); Whitewater, D. J. R. (1 ♂, CIS). **San Bernardino:** 3 mi. N Crossroads, C. D. MacNeill (1 ♂, CAS). **Shasta:** Redding, DRM (1 ♀, UCD). **Stanislaus:** Empire, E. I. Beamer (1 ♀, KU).

Idaho: **Twin Falls:** Rock Cr. Canyon (19 mi. s Hansen), R. L. Westcott (1 ♀, UIM).

Oregon: **Malheur:** 4 mi. N Juntura, H. A. Scullen (1 ♂, UCD).

Texas: **Brewster:** 20 mi. NNW Marathon, M. Masters (1 ♂, CU).

MEXICO

Baja California Norte: 65 mi. s San Felipe, R. D. Gehring (1 ♂, CIS).

Baja California Sur: 3 mi. s Ignacio, MEI (2 ♂, UCR, WJP). Rancho El Cayote, Maynard & Honey (1 ♂, LACM).

Sonora: Bahía San Carlos, P. H. Arnaud (1 ♀, CAS).

SPECIES OF THE BRULLII GROUP

Tachyspex acanthophorus sp.n.

ETYMOLOGY.—The specific name *acanthophorus* is derived from the Greek words *acanthos*, a spine, and *phorein*, to bear, a spine-bearer; with reference to the tarsal spines.

DIAGNOSIS.—The female of *acanthophorus* has a distinctive tarsal feature: one or two subapical spines on each lateral margin of tarsomere

V. and usually central spines on its venter; unlike *armatus*, the tarsomere V lacks basoventral spines. The lateral, subapical spines on tarsomere V occur also in most western females of *mundus*, but unlike that species the mesopleural vestiture is dense (partly obscuring sculpture) in *acanthophorus*. Tarsomere V is similar in *acanthophorus* and the South American species *spinulosus*, but in the latter the gaster is black and the mid- and hindfemora are red.

The males of *acanthophorus* and *armatus* differ from other species of the *brullii* group in lacking a clypeal bevel and graduli, and in having a very narrow clypeal lip and a transverse sulcus on sterna III–VI (the sulcus is visible only when segments are fully extended). Unlike *armatus* (in which the sternal surface is flat), sternum II of *acanthophorus* is somewhat swollen along the foremargin of the apical depression. Furthermore, the mesopleural sculpture is obscured by vestiture or hardly visible in *acanthophorus*, but easily visible in *armatus*.

GEOGRAPHIC DISTRIBUTION.—Xeric areas of southwestern U.S. and northern Mexico.

MATERIAL EXAMINED.—HOLOTYPE: ♀, Arizona, Cochise Co., Willcox, 14 Aug. 1958, P. D. Hurd (UCD).

PARATYPES: 134 ♀, 180 ♂, 1 intersex; May to 7 Nov. Specimens for which institution is not indicated are all in UCD.

UNITED STATES OF AMERICA

Arizona. No specific locality (1 ♀). **Cochise:** 1 mi. E Apache, J. G. Ehrenberg (2 ♂, AMNH); Bowie, A. D. Telford (1 ♀, WJP); 7 mi. SE Dos Cabezas, D. S. Chandler (1 ♂, UAT); Douglas, G. L. Ballmer (2 ♀); 2 mi. E Douglas, R. W. Brooks (1 ♀); Portal, K. V. Krombein (28 ♀, 22 ♂; BMNH, KVK, WJP); 2 mi. E Portal, J. H. Puckle, M. A. Mortenson & MAC (2 ♂); 2 mi. NE Portal, M. & T. M. Favreau (1 ♂, AMNH); Willcox, RMB (2 ♀, 2 ♂), D. D. Linsdale (1 ♀, 5 ♂; AMNH, UCD). **PDH** (1 ♀, 2 ♂, CIS; 1 ♀, USNM). **Maricopa:** 5 mi. N Aguila, GEB & PFT (1 ♀, USU); Tempe, collector unknown (1 ♂, MCZ); 5 mi. SE Wickenburg, PDH (1 ♀, CIS). **Pima:** 30 mi. SE Ajo, C. R. Kovacic (1 ♀); Continental, MEI (2 ♂); Sabino Canyon (Santa Catalina Mts.), GDB & FGW (1 ♂, UAT), FDP & LAS (1 ♀); Tucson, C. L. Crow (1 ♀), M. L. Lindsay (1 ♂, UAT), FDP (1 ♂), FDP & LAS (1 ♀). **Pinal:** 5 mi. NW Coolidge, A. D. Telford (1 ♂); Picacho Pass, DRM & J. E. Lauck (1 ♀); collector unknown (1 ♀, UCR); Superior (Boyce Thompson Arboretum), GDB (1 ♂, UAT).

California. **Imperial:** Brawley, GEB (1 ♀). **Inyo:** Antelope Springs (8 mi. SW Deep Springs), HCC (13 ♀, 11 ♂; AMNH, UCD), PMM (3 ♀), DRM (1 ♀, 1 ♂), JAP, G. I. Stage (11 ♀, 48 ♂, CIS); Deep Springs, H. Nakakihara (1 ♀, UCR). **Riverside:** 12 mi. N Blythe (also 18 mi. W), RMB (2 ♀); 20 mi. W Blythe, JWMS (3 ♀, 1 ♂, CIS); Indio, MEI (1 ♂, UCR); 3.5 mi. S Palm Desert, S. Frommer & B. Morley (1 ♀, 1 ♂, UCR). **San Bernardino:** no specific locality, D. W. Coquillett (1 ♂, USNM). **San Diego:** Borrego, A. L. Melander (1 ♀).

Tulare: Lemon Cove, J. C. Bradley (3 ♀, NYSU; 4 ♂, CU); Three Rivers, collector unknown (1 ♂, CU).

Colorado. **Bent:** Hasty, H. E. Evans (9 ♀, 2 ♂; BMNH, CSU, WJP).

Nevada. **Clark:** Sandy, RCB (1 ♂). **Mineral:** Luning, R. F. Denno & DRM (1 ♀). **Nye:** Mercury (1 ♂, USNM).

New Mexico. **Dona Ana:** Las Cruces, RMB (1 ♀). **Eddy:** 15.5 mi. W Artesia, V. E. Romney (1 ♂, USNM). **Grant:** 25 mi. E Lordsburg, H. A. Scullen (1 ♂). **Hidalgo:** 21 mi. S Animas, J. G. & B. L. Rozen (1 ♀, AMNH); 22 mi. S Animas, J. Rozen & M. Favreau (1 ♂, AMNH); Cienaga Lake, J. H. & J. M. Davidson & MAC (2 ♂); Granite Gap (17 mi. N Rodeo), F. G. Andrews (1 ♀, CSDA); Granite Pass area (20 mi. N Rodeo), Hwy. 80, MSW, J. Slansky & C. Freeberg (1 ♀, CSDA); 1 mi. N Rodeo, J. H. Puckle, M. A. Mortenson & MAC (1 ♂); 4 mi. SW Rodeo, J. G. Rozen (1 ♀, AMNH). **Otero:** White Sands National Monument, RMB (1 ♂). **Socorro:** La Joya (20 mi. N Socorro), W. Rubink (1 ♀, CSU; 2 ♂, USNM). **Quay:** Tucumcari, RMB (2 ♂).

Texas. **Bexar:** no specific locality, H. B. Parks (3 ♀; UCD, WJP). **Brewster:** Big Bend National Park (Nine Point Draw), W. R. M. Mason (4 ♀, 22 ♂; BMNH, CNC, WJP); Big Bend National Park (Boquillas), W. R. M. Mason (1 intersex, CNC); Glenn Spring, F. M. Gaige (1 ♂). **El Paso:** Sierra Blanca, collector unknown (1 ♂, CU). **Hudspeth:** Fort Hancock, CU Exped. (1 ♀, NYSU); McNary, H. E. Evans (1 ♀, 1 ♂; BMNH, CSU). **Presidio:** 3 mi. E Presidio, H. E. Evans (2 ♀, MCZ), J. E. Gillaspay (1 ♀).

Utah. **Garfield:** Shooting Canyon, D. Vogt (1 ♀, 1 ♂, USU). **Washington:** Leeds Canyon, G. F. Knowlton, W. J. Hanson, T. H. Hsiao (2 ♀, 1 ♂, USU); St. George, GEB (1 ♂); Toquerville, G. F. Knowlton, W. J. Hanson, T. H. Hsiao (2 ♂, USU).

MEXICO

Baja California Sur. 4 mi. WSW Miraflores, J. Slansky, M. K. & C. Wasbauer (1 ♀, 4 ♂, CSDA).

Chihuahua. 15 mi. S Chihuahua, H. E. Evans (2 ♀, 4 ♂; BMNH, MCZ, WJP).

Sinaloa. Culiacán, H. E. Evans (1 ♂, CU); s Lorenzo, GEB & RMB (2 ♀, USU); Mazatlán, W. R. M. Mason (1 ♀, CNC); 2.5 mi. N Mazatlán, MSW (1 ♀, CIS); 5 mi. N Mazatlán, MSW & J. Chemsak (1 ♂, CIS). Sonora. Alamos, RMB (1 ♂), W. J. Hanson & T. L. Whitworth (1 ♂, USU); 10 mi. SW Alamos, FDP & LAS (1 ♂); Desemboque, C. & P. Vaurie (1 ♂); 19.4 & 20 mi. S Estación Llano, MEI, EIS, P. A. Rauch (3 ♂, UCR); Guaymas, RMB (1 ♀); 5 mi. S Magdalena, FDP & LAS (1 ♂); Minas Nuevas, C. & P. Vaurie (1 ♂); 10 mi. E Navajoa, W. L. Nutting & FGW (2 ♂, UAT); San Carlos, RMB (1 ♀, 1 ♂).

Tachysphex armatus sp.n.

ETYMOLOGY.—The specific name *armatus* is a Latin word for armed, with reference to the ventral spines of female hindtarsomere V.

DIAGNOSIS.—The female of *armatus* is unique among the North American *Tachysphex* in having basoventral spines on the tarsomere V. Otherwise it is very similar to *acanthophorus* with which it shares other structures of the tarsomere V; one to several medioventral spines and one

or two preapical spines on each lateral margin. The lateral spines are also found in most western specimens of *mundus*.

The male of *armatus* is very similar to *acanthophorus*. See that species for differences.

GEOGRAPHIC DISTRIBUTION.—Desert areas between southwestern Texas and southern California, also Lower California.

MATERIAL EXAMINED.—HOLOTYPE: ♀, Nevada, Clark Co., Sandy, 24 July 1958, R. C. Bechtel (UCD).

PARATYPES: 17 ♀, 9 ♂; May to 5 Sep.

UNITED STATES OF AMERICA

Arizona. **Maricopa:** 10 mi. E Gila Bend, GDB (1 ♀, UCD); Phoenix, R. H. Crandall (1 ♀, UCD); 5 mi. SE Wickenburg, PDD (1 ♀, CIS), P. H. Timberlake (1 ♂, UCR). **Pima:** Tucson, F. M. Carpenter (1 ♀, UCD).

California. **San Diego:** San Diego, F. E. Blaisdell (1 ♀, UCD).

Nevada. **Clark:** Sandy, RCB (1 ♂, WJP). **Lincoln:** Alamo, FDP (1 ♀, WJP).

Texas. **Brewster:** Big Bend National Park, R. W. Strandmann (1 ♀, 1 ♂; USNM, UCD); Big Bend National Park (Nine Point Draw), W. R. M. Mason (1 ♀, CNC). **Hudspeth:** McNary, H. E. Evans (2 ♀, 3 ♂; CSU, WJP).

Utah. **Washington:** Leeds Canyon, G. F. Knowlton, W. J. Hanson, T. H. Hsiao (1 ♀, 3 ♂, USU).

MEXICO

Lower California. 7 mi. SW La Paz, J. A. Chemsak (1 ♀, CIS), 220 km S Tijuana, FXW (5 ♀, CAS).

Tachysphex krombeiniellus sp.n.

ETYMOLOGY.—Named after K. V. Krombein as a mark of friendship and gratitude.

DIAGNOSIS.—*Tachysphex krombeiniellus* is similar to *belfragei* in having a bicolored gaster and short thoracic vestiture which does not conceal mesopleural sculpture. Unlike that species, the propodeal dorsum of *krombeiniellus* is evenly microareolate, and at least the apical third of the hindfemur is red. It differs from *maurus* and *mundus* by the shape of the clypeus (female lip broadened, male middle section slightly longer than wide). It can also be distinguished from *marurus* and most *mundus* by its basally red gaster combined with the partly or all red hindfemur.

GEOGRAPHIC DISTRIBUTION.—Mainly central U.S. between northern Texas and North Dakota, west to 105th meridian, but also South Carolina, Arkansas, and Florida.

MATERIAL EXAMINED.—HOLOTYPE: ♀, Florida, Levy Co., no specific locality, 3 June 1954, H. V. Weems (USNM).

PARATYPES: 22 ♀, 14 ♂; June to Sep. Specimens for which institution is not given below are all in UCD.

Arkansas. **Mississippi:** no specific locality, J. C. Nickerson (1 ♀).

Colorado. **Yuma:** Yuma, collector unknown (1 ♂; 1 ♀, WJP).

Florida. **Gadsden:** Quincy, Malaise trap (2 ♀, UFG, WJP). **Levy:** no specific locality, H. V. Weems (1 ♀, CU; 2 ♂, FSCA; 1 ♀, 1 ♂, USNM; 2 ♂, WJP).

Kansas. **Graham:** Hill City, RRD (1 ♀). **Pottawatomie:** Blackjack, H. E. & M. A. Evans, C. S. Lin, C. Yoshimoto (2 ♂, MCZ).

Minnesota. **Scott:** Barden (between Savage & Shakopee), C. E. Mickel (1 ♀, UMSP). **Goodhue:** Cannon Falls, C. E. Mickel (1 ♀, UMSP).

Nebraska. **Blaine:** Halsey & Dunning, RRD (2 ♂). **Box Butte:** Alliance, RRD (1 ♀). **Dawson:** Gothenburg, RRD (1 ♂). **Douglas:** Omaha, collector unknown (1 ♀). **Hall:** 6 mi. W Cairo, C. W. Rettenmeyer (1 ♂). **Lancaster:** Lincoln, collector unknown (1 ♀). **Lincoln:** North Platte, R. K. Schwab (1 ♀; 1 ♀, WJP). **Nance:** Genoa, R. M. Barnes (1 ♀, INHS). **Thomas:** Thedford, RRD (3 ♀; 1 ♀, WJP).

North Dakota. **Richland:** 11 mi. W Walcott, J. R. Powers (1 ♀, CIS).

South Carolina. **Aiken:** New Ellenton, A. Hook (1 ♀, UGA).

Texas. **Potter:** 5 mi. N Amarillo, D. R. Miller (1 ♂, USNM).

Wisconsin. **Vernon:** Genoa, collector unknown (2 ♀, MPM).

Tachysphex menkei sp.n.

ETYMOLOGY.—Dedicated to A. S. Menke as a mark of gratitude for his help.

DIAGNOSIS.—*Tachysphex menkei* can be easily recognized by the woolly setae of the head and thorax; the finely, sparsely punctate scutum, scutellum, mesopleuron, and propodeal side; the largely impunctate, red gaster; and glabrous male sterna III–VI.

NATURAL HISTORY.—A female paratype is pinned with her prey, a young nymph of a long-horned decicline grasshopper, probably *Eremopedes* sp., det. A. B. Gurney.

GEOGRAPHIC DISTRIBUTION.—Desert areas from southwestern Texas to southern California.

MATERIAL EXAMINED.—HOLOTYPE: ♀, California, San Diego Co., Borrego Valley, 19 Apr. 1957, R. M. Bohart (UCD).

PARATYPES: 8 ♀, 32 ♂, Apr. to June.

Arizona. **Graham:** 18 mi. E Stafford, FGW & GDB (2 ♀, UCD). **Maricopa:** 30 mi. E Gila Bend, R. F. Smith (1 ♂, UCD). **Yavapai:** 10 mi. NW Congress, FDP & LAS (1 ♀, UCD). **Yuma:** 5 mi. SE Bouse, S. A. Gorodenski, JMD, MAC (1 ♂, ASU).

California. **Imperial:** 30 mi. NE Glamis, R. R. Pinger (2 ♀, CSDA). **San Bernardino:** Adelanto, MEI (1 ♂, UCD). **San Diego:** Borrego Valley, H. R. Moffitt, EIS (2 ♂, UCD). **Riverside:** Palm Springs, RMB (1 ♂, UCD); Andreas Canyon, RMB, HKC (10 ♂, UCD, USNM, WJP).

New Mexico. **Otero:** Alamogordo, collector unknown (♂, ANSP). **Socorro:** Bernardo, A. Apperson (1 ♀, USU).

Texas. **Brewster:** Alpine, J. Gillaspay (1 ♂, MCZ); Big Bend National Park (Nine Point Draw), R. Mason, J. F. McAlpine (3 ♀, 7 ♂; CNC, WJP); Big Bend National Park (Santa Elena Canyon), J. F. McAlpine (1 ♂, CNC); Big Bend National Park (near Doughout Well), B. J. Adelson (2 ♂, UCD). **El Paso:** Tornillo, H. E. Evans & Rubink (1 ♀, WJP). **Hudspeth:** McNary H. E. Evans (1 ♀, CSU). **Presidio:** 3 mi. E Presidio, H. E. Evans (1 ♀, MCZ).

LITERATURE CITED

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